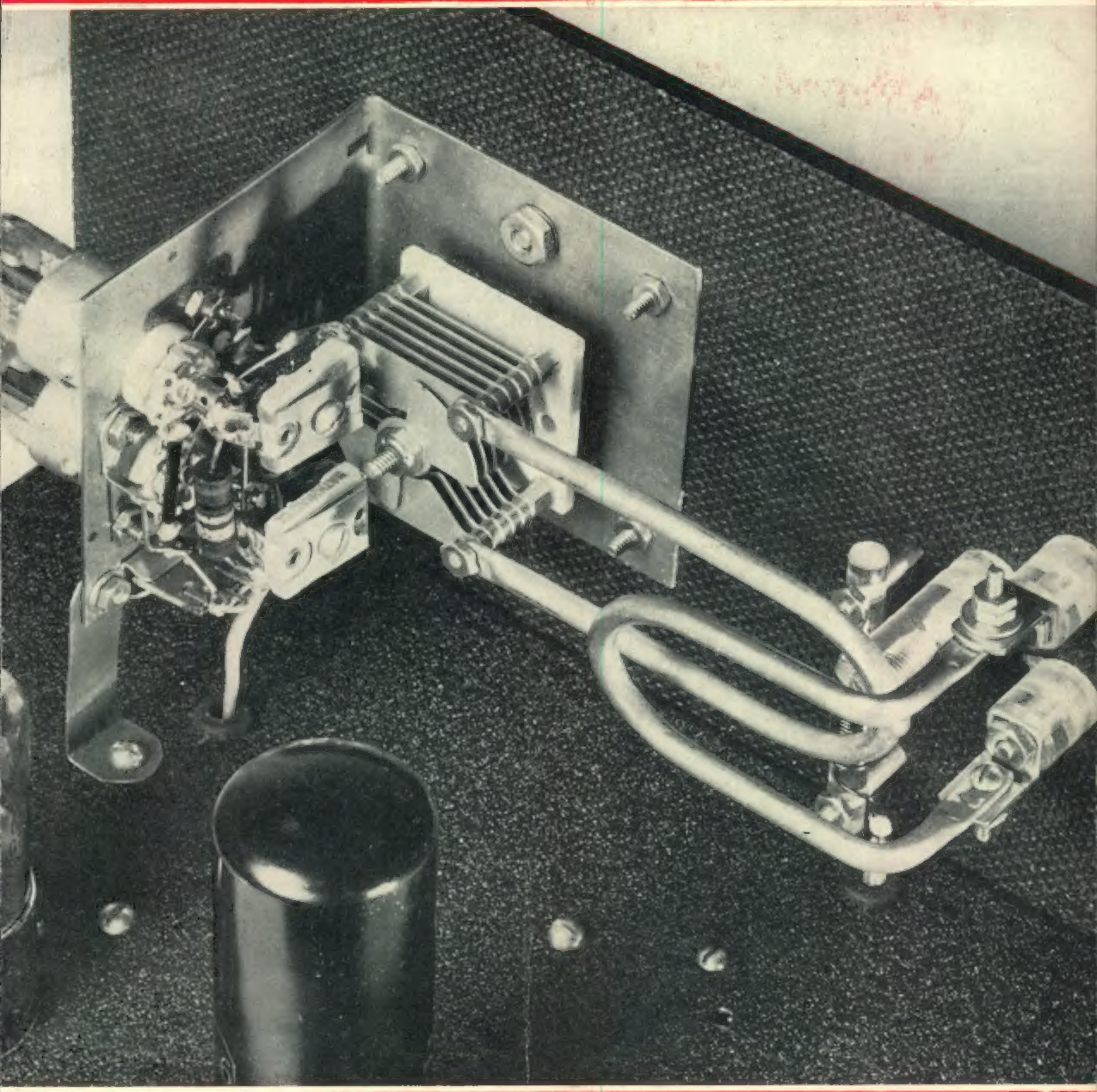
CQ

JULY, 1947

The Radio Amateurs' Journal

35¢



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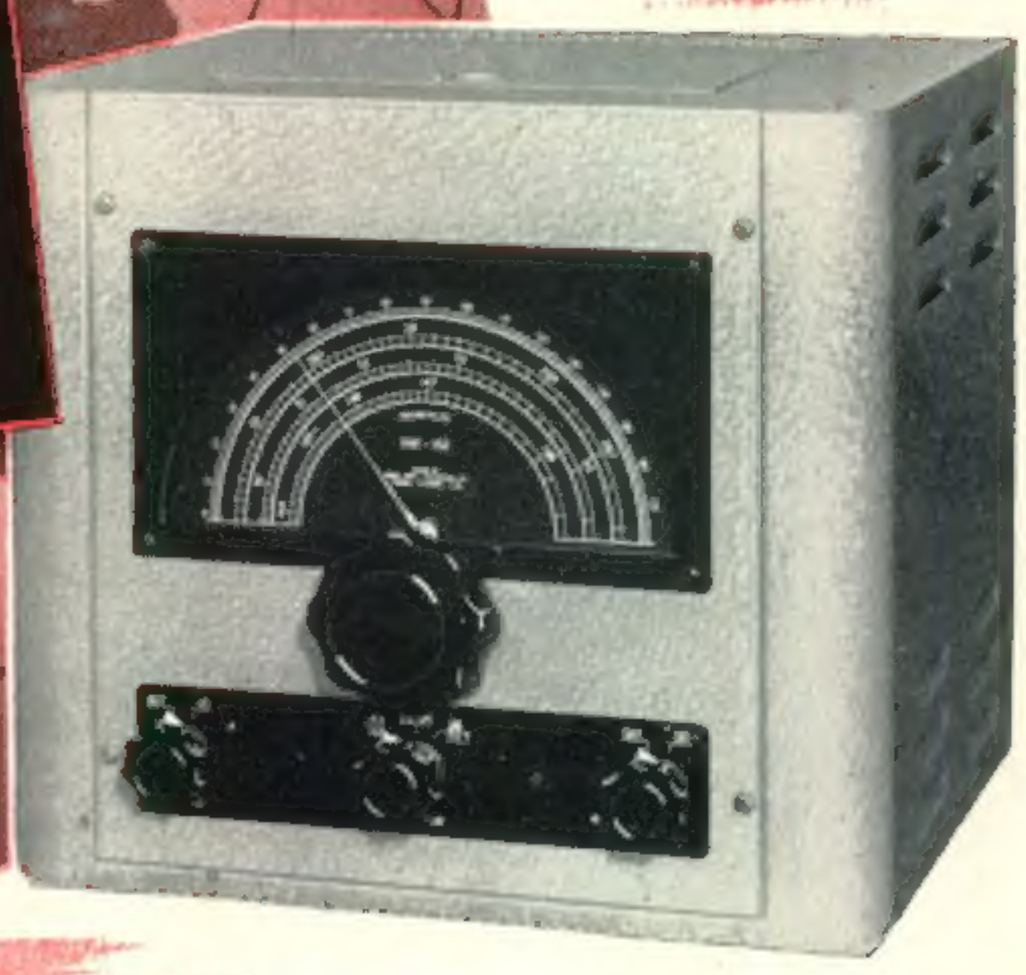

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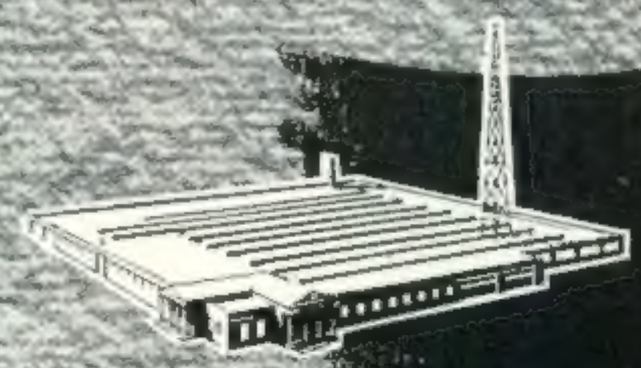

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Vol. 3. JULY, 1947 No. 7

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COVER

Close-up of the "heart" of the v-h-f transmitter, a description of which starts on page 13. Note the compact yet uncrowded assembly around the 6C4 tube sockets. The plate tank loop is held firmly at three points. The adjustable loop is provided with locking nuts to hold it in the desired position, while the r-f choke is fastened to the front panel by means of long screws and metal sleeves made from ½" lengths of copper tubing.

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Know What Band You're In... Avoid "Pink Ticket" Trouble

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• • Letters • •

Television Interference

67-35 Ingram ST., Forest Hills, L.I., N.Y.

Editor, *CQ:*

Realty operators, for legal and esthetic reasons, recently opposed any further television installations pending development of a "master antenna system". Quick to sense the serious threat to television receiver sales, the Television Broadcasters Association appointed a committee to study the problem, work out a tentative installation agreement with the realty operators, and proceed with the development of a satisfactory "master system".

Now will the Television Broadcasters Association be as quick to meet another of their more serious problems? (A problem which also will have a profoundly adverse affect on television sales—particularly in metropolitan areas). I refer, of course, to the interference caused by television broadcasters to the *normal* operation of properly licensed, engineered and operated amateur stations in the 27- to 30-mc bands. (No, I haven't made a mistake—nor is there a typographical error.) I repeat—I refer to the interference caused by television broadcasters to the normal operation of an amateur station.

We stand ready and willing to conduct tests while the manufacturers consider engineering design problems—but we are not going off the air. What is TBA going to do?

Athan Cosmas, W2PKD

QSL Black List?

RFD 1, Slatington, Pa.

Editor, *CQ:*

How about running a column in *CQ* listing the notorious non-qsling DX stations? It might save a lot of the boys from wasting their time and money as well as cards and photos, to say nothing about Exchange coupons.

Edward Knoll, W3OP

Traffic Men's Column?

75 Homesdale Ave., Southington, Conn.

Editor *CQ:*

I have enjoyed my first year's subscription to *CQ* . . . One thing that seems to be missing in your adequate coverage of the various phases of amateur radio is some sort of department for the traffic men. There already is good reporting being done for the v-h-f and DX gang, and I suppose they both far outnumber the traffic men, but it does seem that some coverage might be given to that more highly organized group.

Currently, each net produces and distributes a bulletin on its activities, not only to its own members but to at least the leader of each of several other nets to facilitate correct routing of traffic. Now, it would seem that perhaps that information could be given wider publicity through such a magazine as yours. Of course, it might be said that since A.R.R.L. originally sponsored the traffic idea, they should cover it nicely through *QST*. But, as a matter of fact, there are several darn good traffic men who are not A.R.R.L. members. Maybe they are not readers of *CQ* either.

I'm not plugging for the simple traffic report now included in *QST* section reports, but rather a column devoted to reporting on areas covered by nets, the

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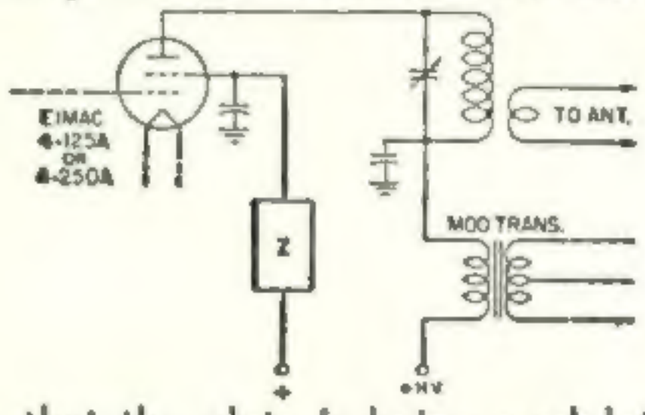
DOES IT TAKE MORE POWER TO MODULATE A TETRODE?

Last month we mentioned the not-too-obvious fact that high-level modulation of an Eimac tetrode takes no more audio power than is normally needed to modulate a triode operating at the same plate input. That this is not obvious is evident from the number of questions asked about it. The incorrect reasoning often used goes something like this: The screen must be modulated—modulating the plate requires audio power, therefore modulating the screen must also take audio power. Sounds logical, but it isn't.

Actually, it doesn't take any extra audio power either from the modulator or elsewhere to get modulation on the screen. Below is a diagram similar to the one shown last month. The only difference between the two is in the nature of the circuit element in series with the d-c screen supply. Instead of an inductance, it is now shown as generalized impedance, Z. This Z may be a resistance, a reactance, a combination of the two, or even a third winding on the modulation transformer.



Assume that the plate is being modulated in the normal manner. As the plate voltage rises on positive modulation swings, the screen current drops, the voltage drop through Z decreases, and the voltage applied to the screen increases. On the negative swings of modulation the situation is reversed, the screen current increases and the screen voltage falls. Looking at the screen we now see quite a different situation from that we are accustomed to seeing in the plate circuit. As the voltage applied to the screen increases, the current flowing to it decreases. This is quite a different affair from what occurs in the plate circuit, where the voltage and current rise and fall together, and power is required for the process. The screen looks like a negative resistance. The screen voltage and current are out of phase, and the screen is not taking power from an external source, but is actually delivering it to Z, provided Z has a resistive component.

The amount of audio power developed by the screen is small—on the order of one watt for the 4-250A at full modulation. This power comes from the screen itself, and the screen dissipation actually decreases under modulation. It is for this reason that the screen dissipation rating of Eimac tetrodes is the same for high-level modulated service as it is for CW.

If the audio power developed by the screen is fed back into the plate circuit via a three-winding modulation transformer, it actually takes less, not more, audio power to modulate the tetrode than the triode. Don't throw away that perfectly good two-winding transformer on this account though, the saving in audio power isn't worth it.

No, it doesn't take any more audio power to modulate an Eimac tetrode, not a single watt.

-W6CEM

EITEL-McCULLOUGH, Inc.
1757 San Mateo Ave., San Bruno, Calif.

personalities involved, etc. For instance, W2ITX, an old timer in traffic, has a new idea for coordinating traffic activities of nets to speed up handling of messages. It is an idea that should get publicity, but so far has been limited to his own distribution of a mimeographed outline.

If the idea has merit, I would be happy to contribute material as a member of Connecticut Net, Trunk Line C, and an occasional participant in Trunk Line AP, Traffic Outlet, NYC/LI, New York State Net and New England Net.

Milton E. Chaffee, W1EFW

What do you say, traffic men? Would you like to have a column in CQ, such as W1EFW subgests, devoted to your special interests? We'll welcome your thoughts on this suggestion, and tell us just what you would like to have in the column.—Ed.

"To Be Continued"

48 Heiskell, Wheeling, W. VA.

Editor, *CQ:*

I do not like continued articles, such as the one on the Trombone T. That kind of journalism smacks of the "true story" technique of keeping up reader interest and circulation. The article was very good and didn't deserve such treatment. . . .

N. B. Davis, W8BTV

Nor do we favor continued articles. But neither is it advisable to devote a disproportionate amount of space in one issue to a single article.—Ed.

The Amateur Newcomer

1535 Ashby Ave., Berkeley 3, Calif.

Editor, *CQ:*

Just a note of appreciation. I don't know a thing about radio, but I subscribed to *CQ* a year or so ago. I've looked through each copy, but it's all to advanced for a beginner. Well, comes the April issue with the new department "The Amateur Newcomer." Now, that's for me. Hope you keep it up.

Eiichi Tsuchida

QSLS

111 W. 7th St., Los Angeles 14, Calif.

Editor, *CQ:*

A great deal has been written about the failure of many amateurs to send the traditional QSL cards. A recent QSO with a VK2 started me thinking about another phase of the general QSL problem and I would like to pass along the idea for what it may be worth.

During this QSO, as usual, I asked the VK for his QSL. Instead of giving me the customary "sure will QSL" he said "Sorri OM don't have any cards so don't expect one". Well that fellow gets my salute. He is honest, and in my opinion a better amateur than the one who says he will send one but never gets around to do it.

Every time a promise is made to QSL which is not kept, a fellow amateur experiences a let down. Isn't it a lot more sporting to tell him not to expect one if you know he isn't going to get one anyway? In short, my thought is this. If for any reason you know or expect that you will not be able to send a card, just tell the fellow so during the QSO. He will respect you a lot more, and you will be doing something to add to his enjoyment of the hobby.

Maurice J. Hindin, W6EUV

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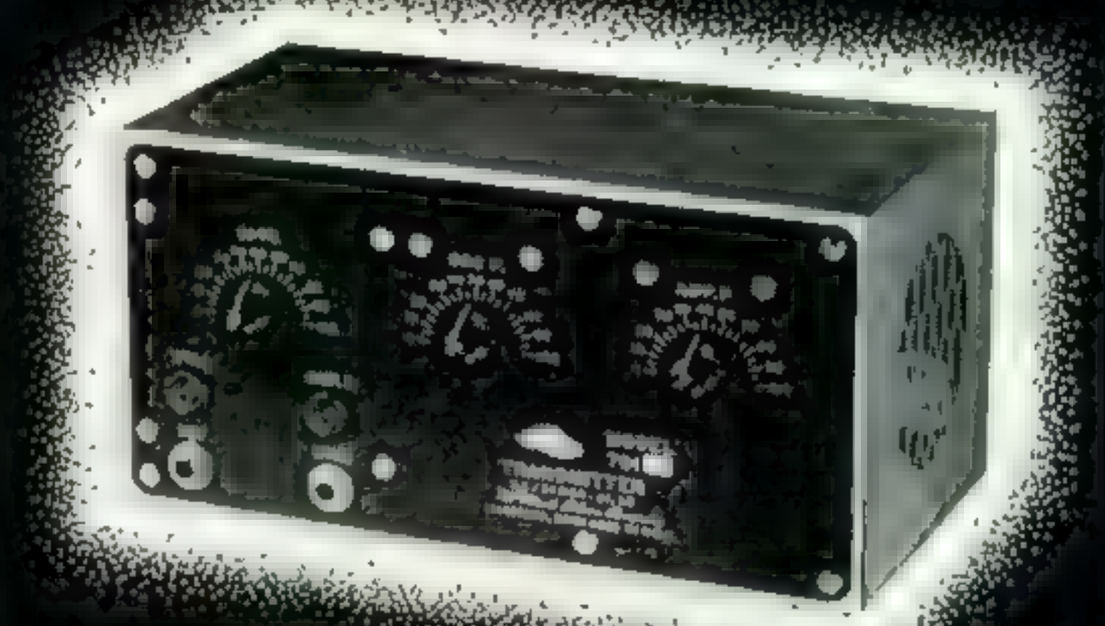

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When QST said *"simply astonishing"* to describe the "MICROMATCH" standing-wave-ratio and r.f. power meter in its April, 1946 issue, there could be no doubt that here was something of tremendous value. Already hundreds in use prove it to be probably the greatest transmitter power gainer you can buy. "MICROMATCH" connected in your antenna feeders — in any link coupling lines — lets you measure the standing wave ratio — power your transmitter generates but *isn't putting into your antenna.* With "MICROMATCH" you can tune your antenna to look like a pure resistive load — easily and quickly. This means a possibly tremendous radiated power gain to you — possibly as much as many hundred percent! Yet MODEL 908 "MICROMATCH," licensed and approved by inventor M. C. Jones, is only $29.90 net — at your favorite jobber. In "ATOM-X" size and style, range 50 through 300 ohms impedance, 10 through 1000 watts power, with big, open 4½" meter, it will pay its way for you as will no other transmitter investment.

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NBFM

"Narrow Band FM for Amateur Use" was the title of an article appearing in March 1946 *CQ*. The first treatise to appear in postwar amateur literature, the piece aroused considerable comment. Subsequent issues of *CQ* carried a number of NBFM transmitters and further theoretical discussion. When the FCC decided to test the adaptability of NBFM to the low frequency amateur bands, special permission was granted to a number of stations to use this form of emission on 20 and 75. We were included in the stations so designated, and conducted various tests for six months. The results, for us and a number of other stations participating in the tests were revealing, but very inconclusive. For example, frequently we were able to communicate as well using NBFM as with AM. On FM, BCI was non-existent, and of course the modulator was just a small handful of equipment. On the other hand, there were long periods when no one could be raised, and when conditions made NBFM unreadable. To expand these tests, the FCC will probably shortly open up portions of 75 and 20-meter phone for FM emission on a six months or one year experimental basis. It is also hoped that similar permission will be granted for the *entire* 10-meter and 6-meter phone band. At the end of this test period, if NBFM proves successful it will be here to stay, if not, the existing restrictions will again be in force.

The purpose of the narrow band FM tests is to determine principally the following facts: whether narrow band FM radiophone can be utilized within the bands normally occupied by amplitude modulated transmissions without causing any greater interference under equivalent power and audio frequency conditions; to determine the effect on broadcast, FM, and television sets with the stated object of reducing or eliminating broadcast interference; to determine whether a greater technical competency would be required by the amateur to operate an FM station; to determine whether narrow band FM offers improvements in reception on an AM receiver insofar as signal-to-noise ratio, etc., are concerned; to determine what method of monitoring and what test equipment would be required for an amateur to properly observe true narrow band FM transmissions. It would also be desirable if these tests could determine whether FM c.w. can be utilized by the ham without causing more interference and whether any advantage may be gained from this form of transmission in the amateur services. C-W tests would unfortunately have to be conducted in the phone portion of the band opened for NBFM, and would likely have to be covered by special FCC authorization. The advantage of using a ratio discriminator on the low frequencies will, of course, also be under investigation. It is the groups of hams cooperating in these tests who must ultimately decide its fate. The test period is itself a mark of confidence placed in the amateur fraternity by the FCC. It is up to the amateurs to fully justify this confidence.

A Topic of Conversation

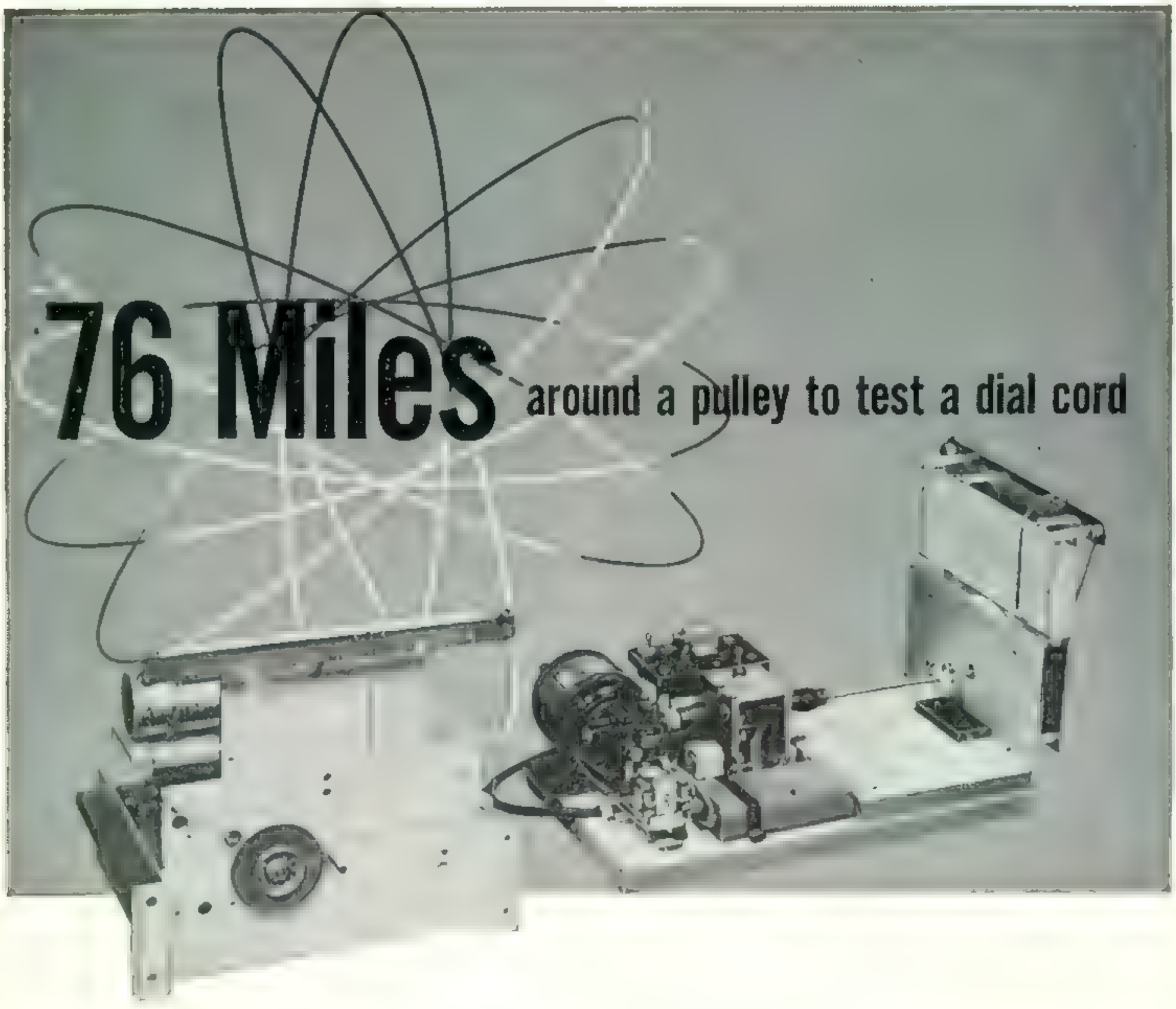
HAVE YOU EVER spent an afternoon just idly tuning across the amateur bands? We do, frequently, and one thing has become very apparent since the war—operating habits are steadily improving. Courtesy on the air is rapidly becoming the rule rather than the exception, and even the highly competitive DX bands are becoming less hectic in the realization that too many of the gang were practicing self-extinction.

One topic of discussion, not too widely practiced but worthy of calling to our readers' attention is, the discussion of controversial subjects on the air. This is a land of free speech; in fact, without doing a lot of flag-waving it is reasonable to say that freedom of speech is one of our most priceless possessions. But freedom of speech does not automatically mean freedom from discretion!

In one instance we overheard a discussion between two c-w operators concerning the phone-c.w. question. The c-w station actually used profanity in describing some neighboring amateur who was causing him interference. Perhaps very few people eavesdrop on this sort of QSO, but our personal opinion of that particular c-w operator was not good. Even if he were correct in his complaint, the narrow-mindedness of his remarks indicated no genuine desire to cooperate with his neighboring ham.

More serious was a heated discussion about national politics between two amateurs, both with walloping signals from over 2000 miles away. Politics are pretty much a matter of one's personal opinion and do not lend themselves to rational discussion, especially when violent partisans are involved in the talks, as was the case in this QSO.

[*Continued on page 64*]



Seventy-six miles—that's how far the dial cords have travelled in each of the two life tests shown in the photograph. Over 400,000 feet, reversing direction over 800,000 times, pulling, turning, twisting—but they'll take it. These dial cords are used with the Collins band-lighted dials on equipment for amateur radio. *To equal this performance, the tuning knob would have to make more than 6,420,000 revolutions!*

This is one of many different kinds of tests that are given the various components, sub-assemblies, and assemblies in Collins equipment. Tests like this represent years of actual service. They are a contribution to the years of satisfactory service that you can confidently expect from Collins ham gear.

Ask for illustrated bulletins describing our radio equipment for amateurs. Here's the list:

30K 500 watt transmitter, PTO control.
32V 150 watt transmitter, PTO control.
70E-8 Permeability Tuned Oscillator.
75A double conversion receiver.
310B 15 watt all band exciter, PTO control.
310C-1 PTO frequency control.
310C-2 PTO frequency control.

These are all post-war units. Write today for details.

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COLLINS RADIO COMPANY, Cedar Rapids, Iowa

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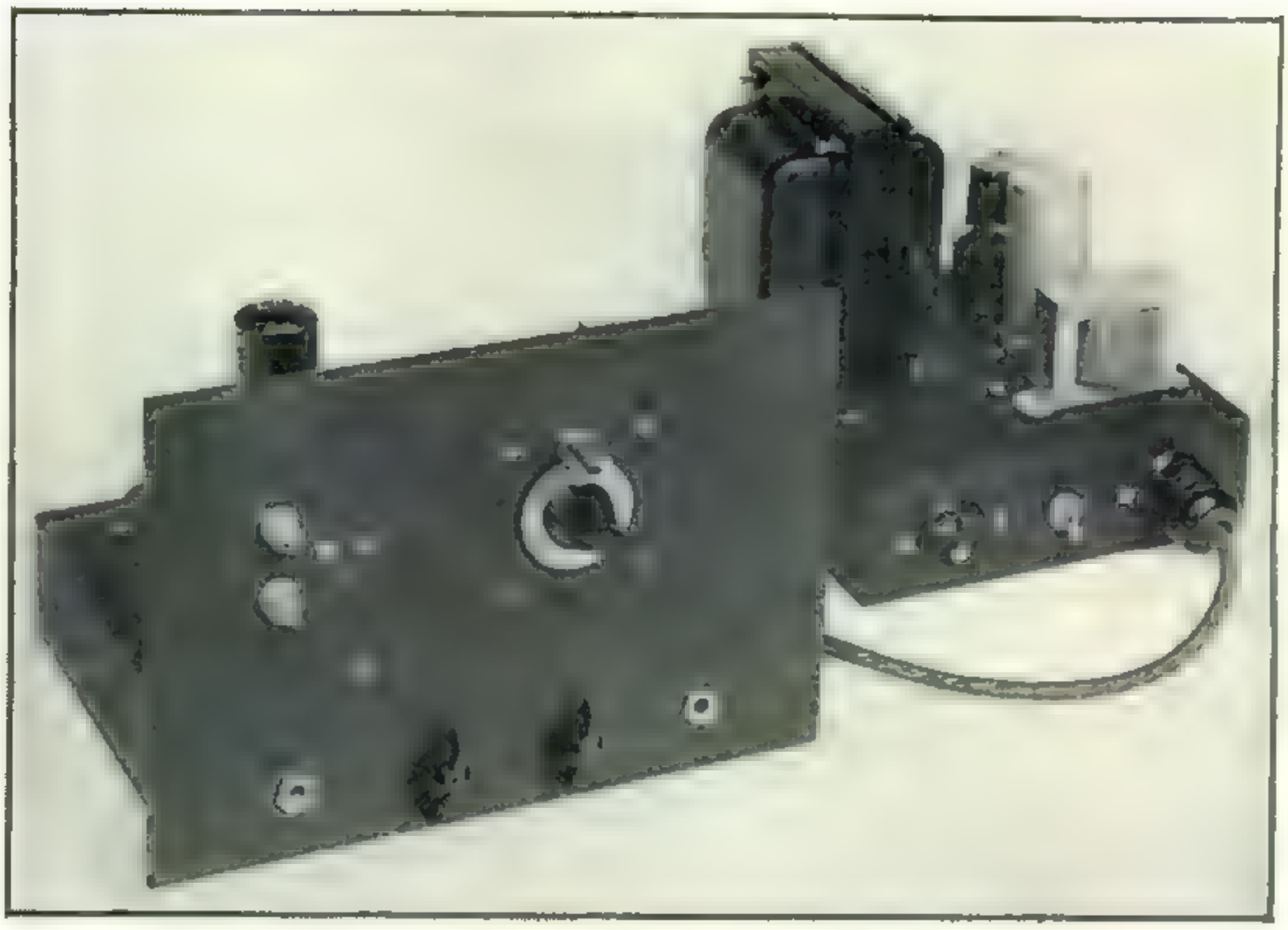


Photograph A. Front view of the v-h-f transmitter and its associated power supply. The essential controls are conveniently located on the front of the transmitter and, from left to right, include: key jack, voice-m.c.w. switch, gain control, microphone jack, and tuning dial. The dial lock also serves as a pointer for the 0-10 numbered tuning dial. The two-wire control circuit from the v-h-f receiver plugs into the receptacle on the front apron of the power supply and the adjacent switch permits operation of the transmitter without the receiver.

Complete 2-Meter Transmitter

A. DAVID MIDDELTON, W1CA*

A v-h-f transmitter described in sufficient detail to enable anyone to tackle two meters and get a good signal on the air.

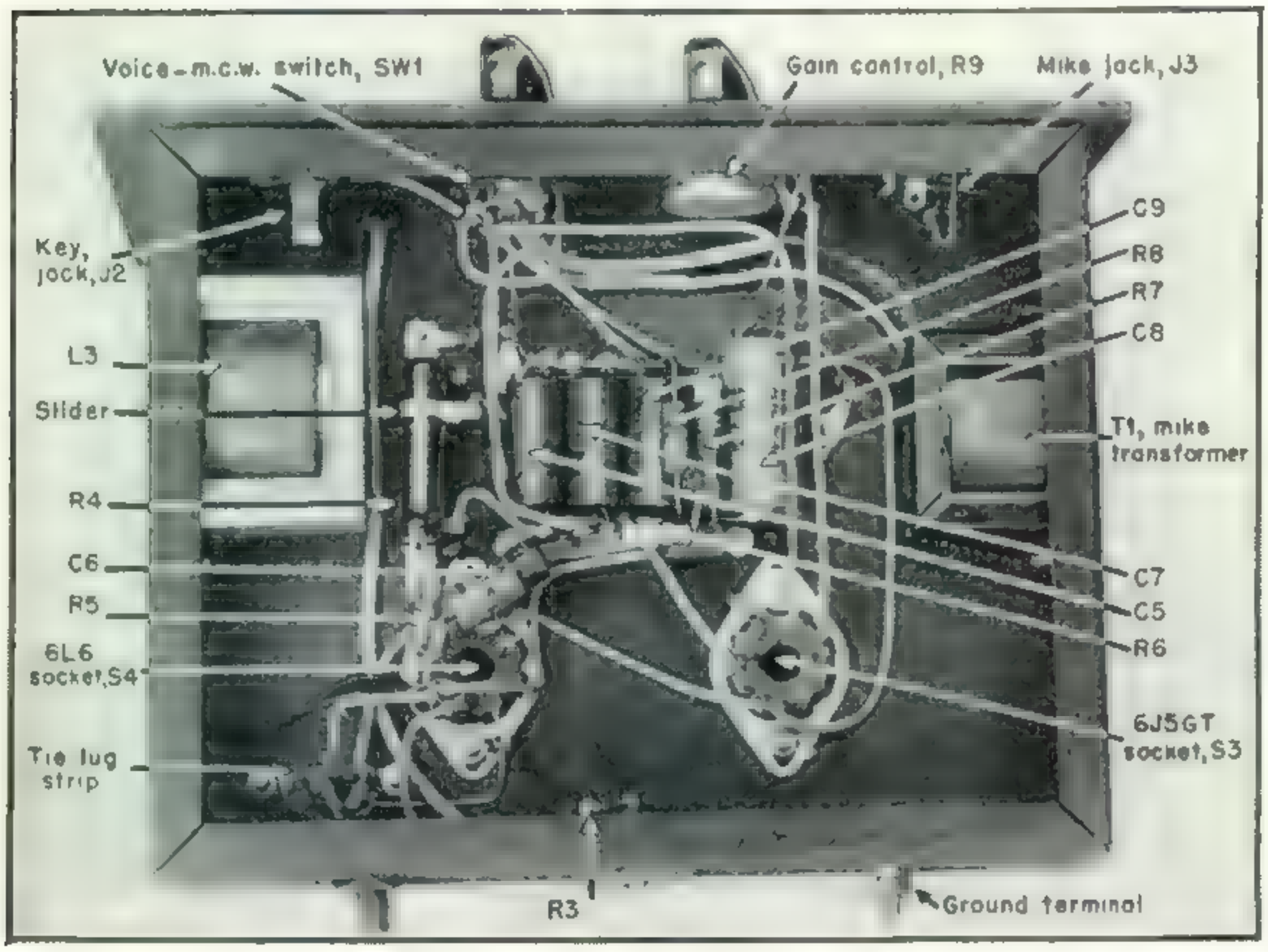
THIS 144-148-mc transmitter consists of a pair of 6C4 triodes in a push-pull Colpitts circuit, plate-modulated by a 6L6. A 6J5 resistance-coupled amplifier provides either tone (modulated c.w.) or voice modulation. A single-button carbon microphone is employed in voice operation. Front panel controls change the type of emission and adjust the audio gain to the amplifier. A microphone jack and a key jack are also located on the front of the transmitter. Provision is made for a two-wire line to either an antenna tuning unit or to an antenna. The balanced "butterfly type" tuning condenser, once set on frequency, is locked in place by a dial lock on the front panel. A behind-the-panel variable coupling device permits proper adjustment of the load on the oscillator.

Ceramic tip-jacks located on the rear apron of the transmitter permit the connection of a milliammeter into the oscillator high voltage lead so that the plate current can be measured. A 50-ohm resistor is connected across the tip-jacks, into which the meter leads are plugged, eliminating the normal plug and jack arrangement with its attendant high voltage on the panel.

The r-f components of the oscillator are mounted on a sub-chassis made of 3/32 or 1/16th inch stock. The feed-back condensers are mounted directly on the tuning condenser. A hair-pin loop, made of 3/16th inch copper tubing, fastens directly to the tuning condenser and is supported by a sturdy polystyrene pillar at the closed end of the loop. The variable antenna loop is also mounted on polystyrene using thru-panel insulators. A small copper ground strap connects the r-f sub-chassis to the main chassis. A 7″ x 9″ x 2″ metal chassis and a 7″ x 10″ x 3/16″ Masonite panel make up the basic structure of the transmitter.

A separate power supply, furnishing the required filament and plate voltage for the transmitter, is contained on a 7″ x 7″ x 2″ chassis. Connections between the transmitter and power supply are provided by a cable which terminates

*23 River Glen, RFD, Farmington, Conn.



Photograph B. Under-the-chassis view of the v-h-f transmitter. Most of the small components are grouped around the two six-lug tie-strips in the center of the chassis. The "open" type of wiring helps prevent unwanted feedback.

in a plug and socket on the front apron of the power supply chassis. A two-pin female socket, located on the power supply chassis, is wired to an integral relay. This relay, when energized, (by operating the associated v-h-f receiver's Send-Receive switch to "Send") grounds the center tap of the high-voltage plate transformer thus completing the high-voltage circuit applying power to the transmitter. A switch on the front apron of the power supply permits operation of the transmitter without having the receiver connected as this switch is in parallel with the contacts in the female socket. The a-c On-Off switch is located on the *rear* apron adjacent to the a-c cord.

Preparation of the Panel and Chassis

The Masonite panel drills easily and care should be taken when the drill starts through the panel, so that a clean hole is left.

In most localities, a piece of copper stock or aluminum (for the sub-chassis) can be obtained from a tin shop or roofing contractor. In the event that copper is not available, a piece of galvanized sheet-metal will suffice. The holes should be drilled and then the right-angle bend made in the bracket. One of the simpler ways to make such a bend is to place the stock between two pieces of hard wood aligned right on the mark where the bend is to be made. Place the assembly in a vise and clamp tightly. Make sure that one of the pieces of wood is *exactly* along the line where the bend is to be made. Then with a firm movement, bend over the stock. Sometimes it is well to hold another piece of wood behind the metal using it to bend the stock, as this will provide equal pressure on all parts of the piece. If a scrap of material is available, make a "practice bend" before actually bending the drilled bracket.

If the sheet-metal shop man is friendly, it may be that you can have the stock cut to size, and the 90-degree bend made in it at the shop. Then you can do the drilling later. It is not difficult to drill the sub-chassis after it is bent.

Do *not* mount the sub-chassis until after its components have been placed and wired.

Lay out and drill the transmitter chassis. After making the holes place the panel and chassis together and fit the front apron components into place. It will be necessary to remove all excess washers and nuts so that the sleeves of the jacks will protrude through the thick panel. However, a little experimentation will reveal how to get the front panel nuts on, and tightened down. The gain control resistor, *R9*, and the M.C.W.-Voice switch, *SW1*, are temporarily placed in position but *not* tightened down.

Assemble the various components on the chassis as in *Photograph B*. Place the two octal sockets with their keys (the detent in the center hole) facing the *center* of the chassis. Two six-point tie lugs are placed in the center of the chassis thus making a mounting for the condensers and resistors. A three-point tie lug is placed near the cable grommet hole, through the rear apron. The end lugs and the slider of *R4* are placed facing the *center* of the chassis as shown in *Photograph B*.

The microphone transformer and the modulation choke are mounted on the inside of the end aprons of the chassis. Place ground terminal on rear apron.

Assembly of the Power Supply

Mark and drill the chassis. Note that socket holes (1¼ inch) are used to run the leads of the power transformer through the chassis. Place the components as shown in *Photographs B, C and D*. The resistor, *R10*, will just fit across beneath the filter choke, *L4*, held by the mounting screws for *L4*. If the indicated type of fifter condenser is used, there will be a bakelite mounting plate furnished. This plate fastens to the underside of the chassis just like a tube socket plate. The condenser is then plug:ed in the small slits in the plate. Grasp these tips that stick through the bakelite, and turn each one about a quarter turn. This will hold the condenser in place. There will be two lugs in the center of the condenser. These are the two *positive* connections to the condenser. Do not twist these.

The power transformer is placed with the primary (black wires) leads and the high-voltage (red wires) leads coming out the hole nearest the center of the chassis.

Note—Sometimes it is difficult to ascertain which are the *black* and which are the *red* leads. The wax applied to the leads often discolors the fabric. However, by scraping the fabric lightly with a knife, some of the wax will be removed and the color will show in a more natural manner.

Testing the V-H-F Transmitter

The first tests should be made on the power supply. The following sequence should prove helpful:

A. Inspect and check all of the power supply wiring.

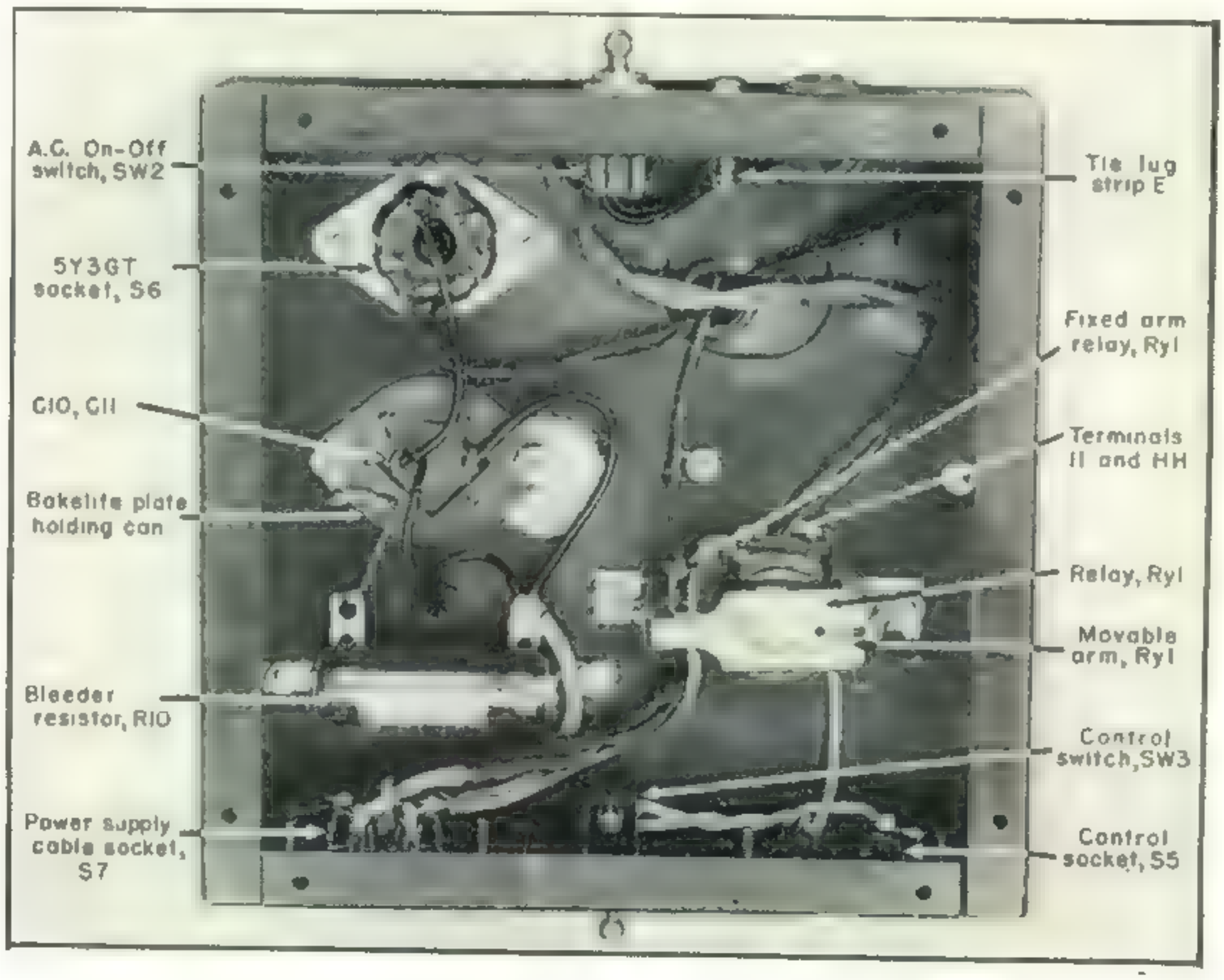
B. Throw *SW2* and *SW3* to the *Off* (down) position. With the transmitter cable unplugged and without the rectifier tube, the 5Y3GT, in its socket, plug the a-c line cord into a fused 115-volt outlet. Throw *SW2* to *On*. This will close the 115-volt input circuit. With a 0-10 a-c voltmeter (or a 6-volt pilot lamp substitute) check between pins 4 and 5 of *S7* and ground. There should be approximately *six volts* present on the meter (or the pilot bulb should burn normally).

C. Turn off *SW2*. Replace the 5Y3GT in its socket. Operate *SW2* and observe if the rectifier tube glows. Do not proceed further until the 5Y3GT filament voltage is applied correctly and satisfactory 6.3-volt filament output is obtained on *S7*.

D. If the filament circuits are correct, proceed with the high-voltage tests. From this point on there will be a constant presence of a *lethal high voltage*. While 300-350 volts might not kill *you* it pays to be on the alert against any possible danger of electrical shock.

Turn off the a-c input and connect a 0-500 d-c voltmeter between pin 3, *S7*, and ground, with the *positive* connection of the meter to pin 3. Operate *SW2* to *On* and after a 30-second wait, operate *SW3* to *On*. This should energize and close relay *RY1*. The voltmeter should read approximately 325-360 volts. If no suitable high voltage meter is available, place three small 115-volt bulbs in series and use this in place of the voltmeter. Operating *SW3* on and off should turn the high voltage on and off, correspondingly. If this voltage is not secured or if the control action is not proper, recheck the wiring and the components. The rectifier tube might be defective. A filter condenser might be defective, or *L4* might be open.

E. With high voltage present on pin 3, *S7* and with the proper filament voltage present on pins 4



Photograph C. Under-the-chassis view of the power supply for the v-h-f transmitter. Free-style wiring is employed as there are no "critical" positions in the power supply circuits.

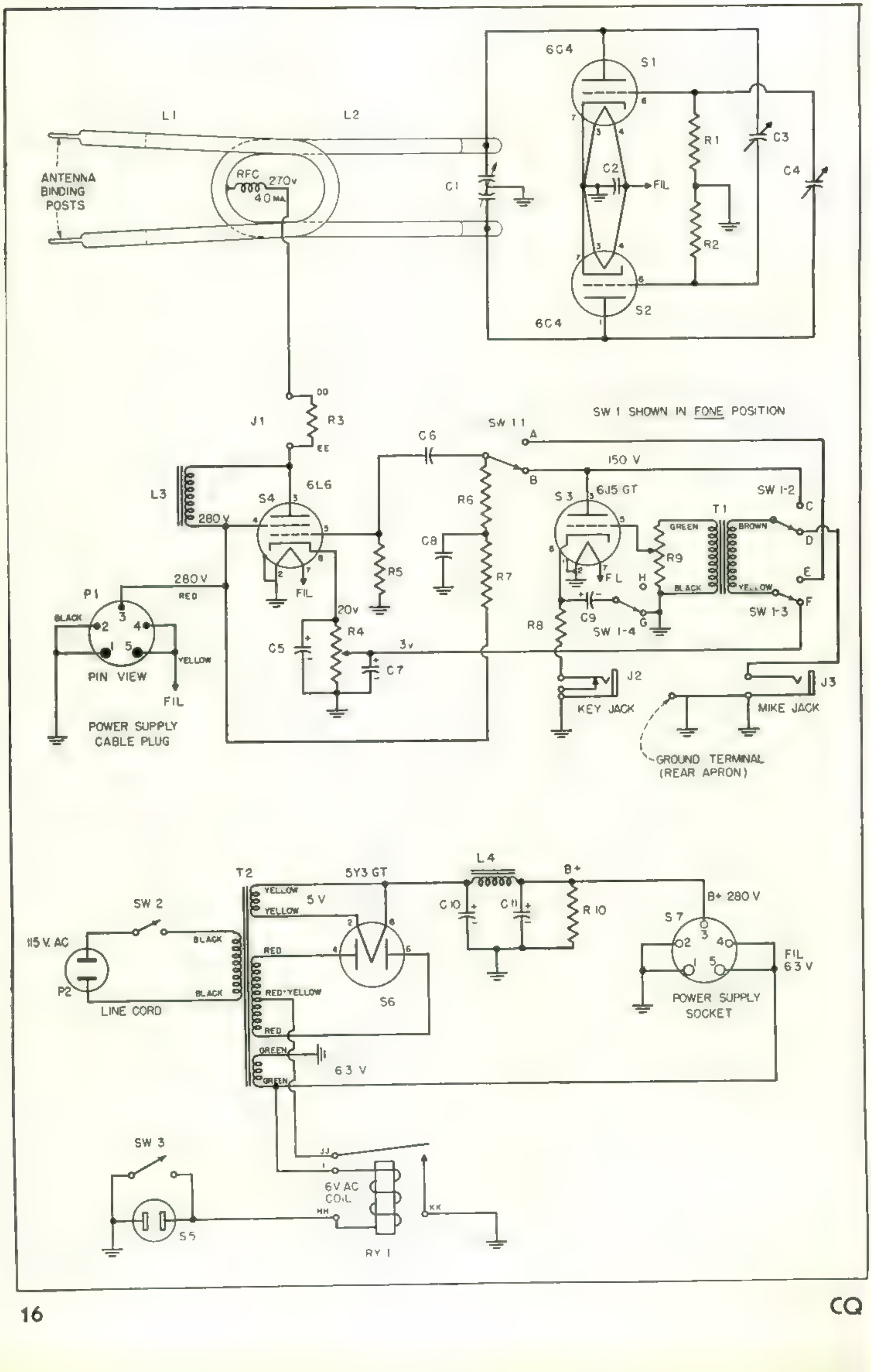

L1
L2
ANTENNA BINDING POSTS
RFC
270v
40 MA
C1
6C4
S1
6
7
3
4
R1
C3
C4
C2
FIL
R2
S2
1
6C4
SW 1 SHOWN IN FONE POSITION
SW 1 1
A
B
C6
150 V
J1
R3
DD
EE
6L6
L3
S4
280 V
6J5 GT
S 3
SW 1-2
C
D
E
F
T1
GREEN
BROWN
BLACK
YELLOW
R9
SW 1-3
SW 1-4
G
H
C9
R8
C8
R6
R7
R5
FIL
20v
R4
C5
C7
3v
280 V
RED
P1
BLACK
YELLOW
PIN VIEW
FIL
POWER SUPPLY CABLE PLUG
J2
KEY JACK
J3
MIKE JACK
GROUND TERMINAL (REAR APRON)
T2
5Y3 GT
L4
B+
B+ 280 V
C10
C11
R10
S7
FIL 6.3 V
POWER SUPPLY SOCKET
SW 2
115 V. AC
P2
LINE CORD
YELLOW
5 V
RED
RED-YELLOW
S6
GREEN
6.3 V
SW 3
S5
JJ
II
6V AC COIL
KK
HH
RY 1

Fig. 1. Complete schematic diagram of the v-h-f transmitter and its associated power supply.

V-H-F Transmitter Parts List

C1—3-13-$\mu\mu$f variable (Cardwell 6078-ER 16-BF-S).
C2—.002 μf mica.
C3, C4—10-$\mu\mu$f ceramic trimmer.
C5, C7, C9—10μf 25 volts, electrolytic.
C6—.01-μf paper.
C8—8 μf 450 volts, electrolytic.
C10, C11—20 μf 450 volts, electolytic.

R1, R2—10,000 ohms, 1 watt.
R3—50 ohms, 1 watt.
R4—300 ohms, 10 watts, wire-wound, adjustable.
R5—270,000 ohms, 1 watt.
R6—50,000 ohms, 1 watt.
R7—4700 ohms, 1 watt.
R8—2200 ohms, 1 watt.
R9—500,000-ohm potentiometer.
R10—25,000 ohms, 25 watts, wire-wound.

L1—Antenna loop. 3¾ inches long, 1¼ inches wide, 3/16th-inch copper tubing.
L2—Plate tank loop. 4 inches long, 1¼ inches wide, 3/16th-inch tubing.
L3, L4—Choke, 10-15 h, 100 ma

T1—Microphone transformer, (single-button carbon microphone to grid), midget type.
T2—Power transformer. 700 volts c.t., 5 v. 3 amp., 6.3 v. 4.5 amp.

P1—5-pin cable plug and cap (Amphenol PM-5).
P2—Male plug, on a-c line cord.

S1, S2—7-prong socket, miniature, ceramic (Johnson 277B or equivalent).
S3, S4, S6—8-prong socket, bakelite (Amphenol RS8).
S7—5-prong socket, bakelite, (Amphenol RS5).
S5—Female chassis socket (Amphenol 61F1).

RY1—Relay. SPST 6-volt a-c coil, midget type.

SW1—4-pole, 2-position rotary switch, midget type.
SW2, SW3—SPST toggle switch.

J1—Tip-jacks, ceramic. (Millen crystal socket No. 33102).
J2—Jack, closed circuit.
J3—Jack, open circuit.

RFC—30 turns, No. 22 enameled wire close-wound, 1" long, on ¼" polystyrene rod.

1—7 x 9 x 2 chassis. (Bud CB-790 or equivalent).
1—7 x 10 x 3/16 panel, Masonite. (Bud PM-607 or equivalent).
1—Dial, 1⅝ inch diameter. (Millen No. 10007).
1—Dial lock. (Millen No. 10050).
2—Knobs, pointer, for ¼ inch shaft (Bud K-580 or equivalent).
2—Feedthru bushings, polystyrene (Bud I-1910 or equivalent).
2—6-point tie-lug strips.
4—3-point tie-lug strips.
Tubes—6C4 (2), 1 each 6J5GT, 6L6, 5Y3GT.
Miscellaneous hardware: 6/32 nuts and bolts, 4/36 x ¼ machine screws (16); grommets ⅜" ID (2), ¼" ID (3); ½" angle brackets, brass (2); polystyrene rod (3"); soldering lugs for 6/32 screws; single circuit headphone type plugs (2); a-c line cord; spaghetti, hook-up wire.

and 5, proceed with the tests on the transmitter proper.

F. Turn off the 115-volt a.c. Remove the 5Y3GT from the power supply. Plug in the transmitter cable. Place all the tubes in the transmitter. Operate *SW2* to *On* and observe if the filaments light. The filament of the metal 6L6 will naturally not be visible, but the metal envelope should warm up slightly. The glow of the other filaments should be visible.

G. When it is determined that the filament circuits are connected satisfactorily it is safe to proceed.

Remove all the tubes from the transmitter. Replace the 5Y3GT rectifier tube. Operate *SW2* and after a 30-second wait operate *SW3* to *On*. Measure with the d-c voltmeter (or its substitute) between the following points and ground to test for the proper high voltage.

Location	*Approximate d-c voltage*
S4, pin 3	280-300 (or more)
S4, " 4	280-300
S3, " 3	150-170
Point DD on jack *J1*	275-300

Stator connections on condenser *C1*, same as DD.

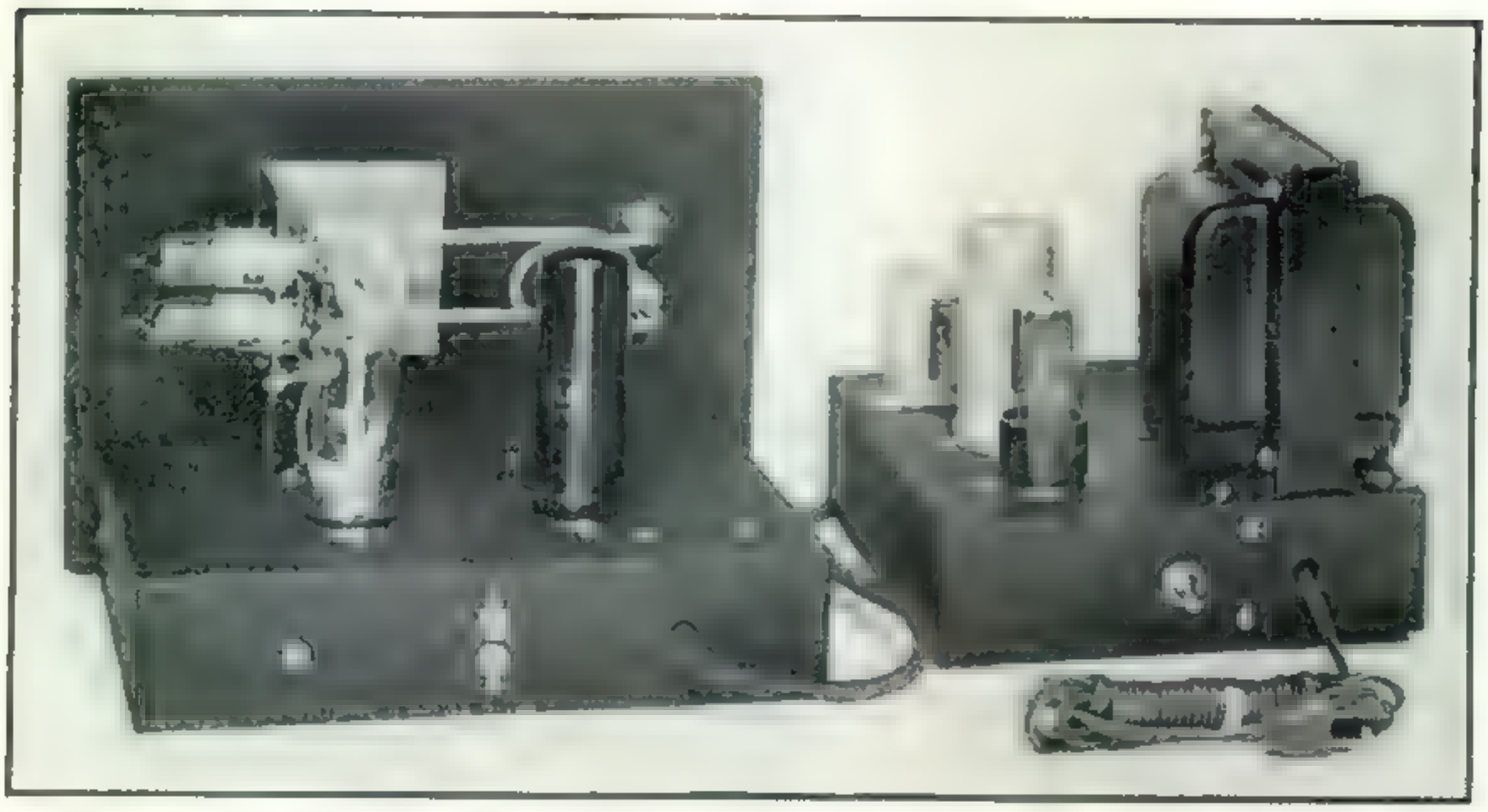
After ascertaining the presence of these approximate voltages turn *off* the a-c input. Replace the 6C4 tubes in *S1* and *S2*.

Loosen the screws on the feed-back condensers *C3* and *C4* until there is a gap of approximately 1/16th inch at the free end.

Place the leads to a 0-100 d-c milliammeter into jack *J1*, on the rear apron. If wired as shown in *Fig., 1* EE is the *positive* connection to the meter and DD is the negative. (If a suitable meter is not available substitute a 150-ma pilot lamp bulb for the meter). Close *SW2* and after a 30-second wait, operate *SW3*. The plate milliammeter should indicate approximately 30-35 milliamperes (or the pilot lamp should glow). Connect a "Christmas tree bulb" (15-volt) or a 6-8 volt pilot lamp to the two antenna posts on the front panel in order to use the antenna loop, *L1*, as a "pickup loop". Adjust the feedback condenser, *C3*, until a slight dip is observed in the plate current as read on the meter connected to *J1*. Leave *C3* in that position and adjust *C4*, similarly. A point should be reached where the slight turning of *either* screw will cause the plate current to *rise*. The plate current will be around 30 to 40 ma with the antenna loop (with its lamp) coupled within one-half inch. Reduce the coupling by moving the antenna loop away from the plate loop. The plate current should *decrease* by 10 to 20 ma when the pickup loop is at right angles to the plate tank, *L2*.

Possible faults that might cause the oscillator to be inoperative would include:

Short in *C1*. Remove loop *L2* and make continuity test on condenser terminals. Incorrect wiring (check wiring). Error in placing *C3* and *C4*. (These condensers must be connected from the



Photograph D. Rear view of the v-h-f transmitter and its associated power supply. Left to right along the rear apron are: The ground terminal, the ceramic tip jacks (a ½-inch crystal socket) the power cable and, on the power supply, the a-c On-Off switch and the line cord.

plate of one tube to the *grid* of the other tube. See *Fig. 1*). Defective 6C4 tubes. (Have them tested).

Recouple the antenna until the plate current rises to approximately 40 mils. Then, set the frequency with the absorption wave meter. When the absorption wave meter is held near the transmitter plate tank loop *L2* and the wave meter dial is turned, resonance will be indicated by a sharp "bump" in the plate current of the oscillator. If the lamp (connected to the antenna loop) is lit its glow will dip when resonance is reached. Adjust *C1* until a mid-band point is reached as indicated by a jump in the plate current or a dip in the antenna lamp glow. *C1* only has 90 degrees rotation so the dial will read 0 to 5 for full rotation from *minium* to *maximum* capacity.

If a v-h-f receiver is available and its approximate dial calibration is known it may be used for rough check of the operating frequency of the transmitter. In either case, make sure that the transmitter is operating *inside* the 144-148 mc amateur band *before* connecting it to any antenna.

Testing the Modulator

After placing the transmitter "in the band" proceed to test the modulator. Turn off the entire transmitter and place the 6J5GT and the 6L6 in their respective sockets, *S3* and *S4*. Place the slider on the 6L6 cathode resistor, *R4*, about one-quarter inch from the *grounded* end of the resistor.

Turn on the a.c. and allow the tubes to warm up. Plug a single-button carbon microphone into *J3*. Rotate the knob on switch *SW1* to the *counter-clockwise* (voice) position. Rotate *R9* to the right about three-quarters of its rotation.

Operate *SW3* to *On*. Couple the antenna loop so that the bulb connected across its terminals is lit.

[*Continued on page 68*]

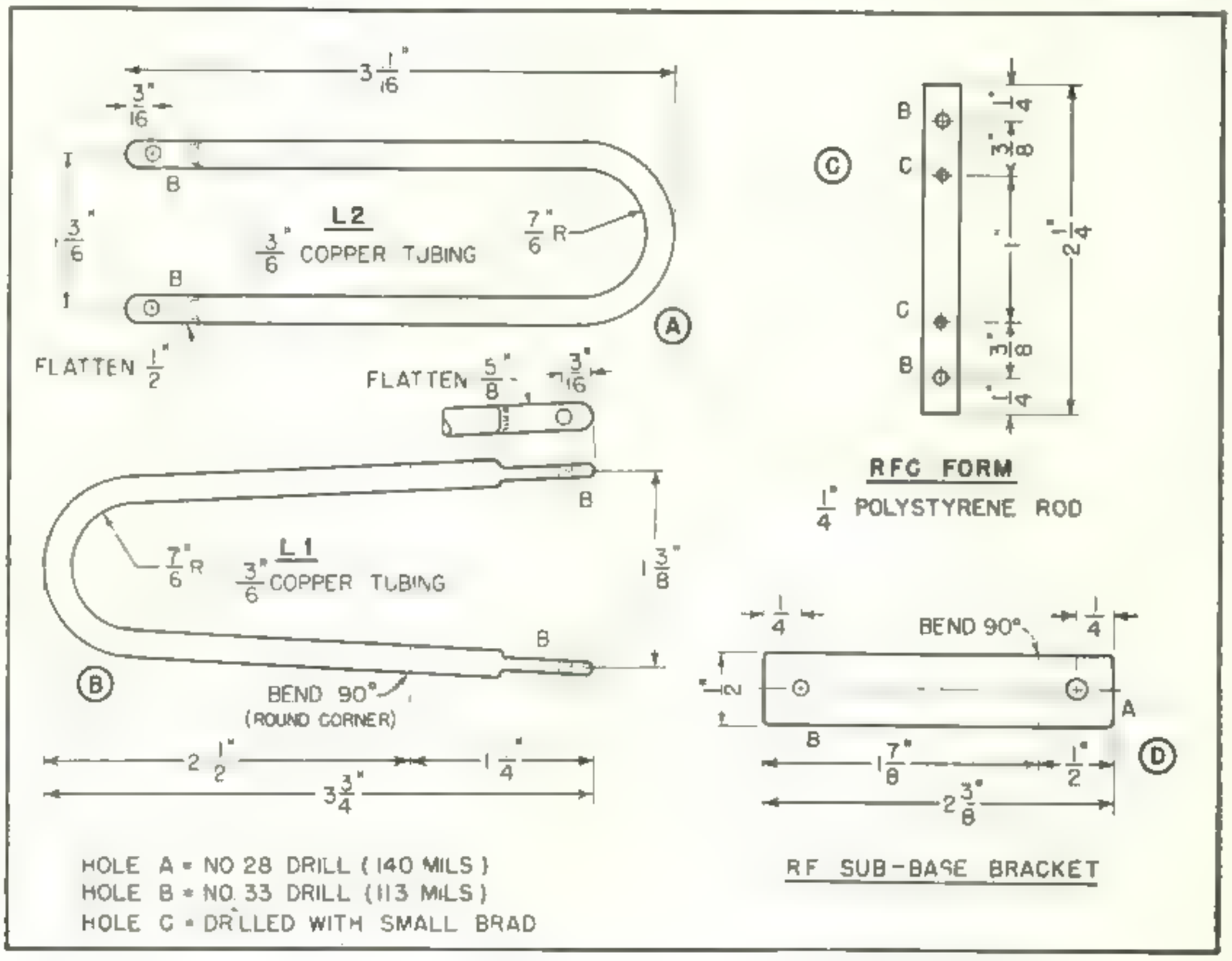


Fig. 2. Fabrication and drilling data for plate and antenna loops, (A and B) radio frequency choke form (C) and grounding strap (D).

This is How You

LEARN THE CODE

HERBERT S. BRIER, W9EGQ*

The biggest stumbling block for most would-be amateurs is the code. W9EGQ points the way with this complete review of the time-tested methods of learning c.w.

IT TAKES MAGIC to master the code, the magic contained in the word *practice*. With practice learning the code is simple; without it, it is impossible. Add *determination* to *practice* and success is assured. Unless you are determined, you will not practice, and vice versa.

Before discussing the mechanics of learning the code, why should you want to learn it? From the unselfish viewpoint, it is a public service. The main reason the government is willing to set aside valuable bands of radio frequencies for the amateur is because his training and skill are assets of the country, especially in a national emergency. And in the eyes of the armed services, the amateur's code proficiency is invaluable.

From the selfish viewpoint you must be able to send and receive the code at a speed of 13 wpm before you can obtain an amateur license, and if you are considering radio operating as a career, code knowledge is essential. Even if you are not, learning the code is no sacrifice. It permits you to get on the air with a minimum of equipment, and is fun. This can be proved by listening on almost any amateur band. No one is forcing all those c-w stations to use code. Many of them have modulation equipment, but they like code. You will too.

During the war the Army, Navy and Coast Guard turned out thousands of competent code operators under a speed-up program, and it might be thought that their methods would be ideal for all. Unfortunately, this is not true. They were taking men who had little interest in the code—if not a down-right aversion to it—and making operators of them in the shortest possible time by drilling code in them many hours a day, six and seven days a week, whether they liked it or not. Learning anything in this manner is the hardest possible kind of work, and demands all of a student's time for many weeks.

You are learning the code voluntarily, and must study in your spare time. Being a willing student is a tremendous psychological advantage, and being able to devote only short periods at a time to it is not necessarily a handicap. While it may take a little more elapsed time to master the code spending 30 minutes a day on it than it would if several hours a day were available, the time spent in actual study will be much less. In other words, two 15-minute periods may be more productive than one period lasting an hour. Regularity is the important thing. Fifteen minutes a day are much better than two hours once a week.

How long it will take to master the code depends greatly on the individual, but it is wise to expect to spend 100 hours in actual practice before being able to copy 15 wpm solidly. The Federal Communications Commission amateur code examination is at a speed of 13 wpm, and a two-wpm "cushion" will take care of a slight loss of speed caused by nervousness at the time of the examination.

The code is an auditory method of communication and should be learned as such. Do not memorize it from a printed chart, except as a last resort. Ideally you should not even look at a code chart until you already know the code. That is why the code chart accompanying this article is near the end.

There are four ways of learning the code. Under the tutorship of a skilled operator, going to a code class sponsored by a radio club or at one of the local schools, studying with another student, and studying entirely alone. Most students use a combination of several. Working with a

*385 Johnson St., Gary, Ind.

tutor is undoubtedly the best method, followed closely by studying with another student. Code classes are valuable, but most of them are not held frequently enough to be depended upon without supplementary study. (This, of course, does not include regular radio schools, where code instruction is given daily.) Complete self study will be discussed later.

Most students picture the code as being composed of dots and dashes. This is wrong. It is composed of three equally important parts; two sounds, best described as "dit" and "dah", and spaces. The lack of any one prevents the sending of readable code.

Practice rolling a string of ten or twelve dits off your tongue, dropping the final "t" to aid rapid ennunciation, thus: dididididi . . . Do the same with dah: dahdahdahdahdah . . . Now alternate dits and dahs: didahdidahdidah . . . dahdidahdidahdi . . . Keep the spaces between the dits and dahs short and uniform. Not a great deal of time need be spent on this exercise. The idea behind it is to get the proper rhythm.

Now proceed to memorize the alphabet, numbers, comma, period, and question mark. Start with the vowels, and then go down the list. This is when a skilled tutor is most helpful. If one is not available, commandeer a member of the family and have him help you. He should start like this:

TUTOR: "A, ditDAH."
YOU: "A, ditDAH."
TUTOR: "E, dit."
YOU: "E, dit."
TUTOR: "O, DAHDAHDAH," etc.

Four letters at a time are sufficient. As soon as you know them, have the tutor call out the dit-dahs while you print or write the corresponding letter. Repeat until you can recognize and write them in any order without hesitation. During the next lesson add another group, mixing them in with those already memorized. Do not attempt to do it all in one lesson; although you can arrange for more than one lesson a day if you wish.

Repeat the corresponding dit-dahs to yourself whenever you see a known letter on a sign, in a newspaper headline, etc. DO NOT write down the dit-dahs themselves under any circumstances. After the third or fourth lesson, you will know sufficient letters to copy short words, such as "be," "bed," "cab," "dog," etc. Your tutor can send orally with dit-dahs or by whistling for a short time, but eventually you will require a code practice set of some kind. Whichever code oscillator you build, do not skimp on the key. A rugged, smooth-working one is a definite aid in sending properly, and it can be used later with your transmitter.

Advancing Your Code Speed

Your tutor will send mixed letters, short words and numbers slightly faster than you can comfortably transcribe them—hand printing is best at first—and by the time you have memorized the last character, your copying speed will be about four wpm. A few more hours of practice will bring your speed up to seven or eight wpm, and there you will seem to stick. Do not get discouraged. This common phenomena, known to educators as a "plateau of learning," occurs with most students at speeds of approximately eight, 12 and 16 wpm. Continued practice will get you off the "plateau."

The proper keying position for the hand actually is the one which is most comfortable for the individual operator. In general, this position will be arrived at with the forefinger on top of the knob and the thumb and middle finger resting lightly against either side of it.

If you are one of the fortunate few, the periods of retarded progress will be of very short duration, while with others, equally intelligent, they may last through many hours of practice. Sometimes a "plateau" shows up at approximately four wpm. This indicates that you attempted to memorize the code too rapidly, or are mentally picturing the code as dots and dashes, rather than actually recognizing the code group or letter or number with no intermediate steps.

When you are able to copy a few words a minute it is time enough to start practicing sending with a tutor. He has undoubtedly adjusted the key already, but it is well to know how to do it. First loosen the locking nuts. Adjust the pivot screws so the contacts are centered, and the arm operates up and down freely, yet without sideplay. Set the back screw so there is slightly less than one-sixteenth inch of vertical movement at the key knob. Adjust the spring tension so the circuit is broken as soon as pressure is removed from the knob, but it should not be so great that considerable effort is required to close the key. Excessive tension causes undue fatigue and choppy sending. Insufficient tension or spacing causes sloppy dits and poor, uneven spacing. Once the adjustments have been made, firmly tighten all locking nuts. Nothing is more disconcerting than having your key fall apart in your hand.

Place the key approximately 18 inches in from the edge of the table in line with your right shoulder. Either screw it directly to the table or mount it on a board large enough to supply a firm bearing. Sit up straight in the chair with your elbow on the table, the muscle in the forearm carrying the weight of your arm. Your wrist should be above the table. The correct method of holding the key is subject to a certain amount of individual variation, but the picture shows the usual way. The thumb lays along the left side of the knob, with the slightly curved first and second fingers on the top near the rear edge, and the remaining fingers curve naturally towards the palm. No part of the arm, wrist or fingers should be stiff or tense.

Start by sending a string of ten dits at the approximate rate of four a second. Then send a string of dahs at the rate of two a second. Next send dits and dahs alternately. The exact speed is not important. What is important is the relative length of the dits and dahs, and the spacing between them. In perfect code, the dits and spaces are exactly the same length, and the dahs are exactly three times the length of either.

Watch your fingers and arm; although the key should not be grasped tightly, your fingers should remain on the knob at all times. Your arm should remain quietly on the table. Let your flexing wrist do the work.

After the proper rhythm is acquired, tackle the individual letters. Those like "A", "I", "M", "N", etc., will give little trouble, but those like "C", "F", and "Y" may. Many students—and some old-timers—have a tendency to pause momentarily before or after the internal dah in such letters. "C", for example, being sent "N N", and "F" as "I N". You are using new muscles and they will tire rapidly; so do not send more than a few minutes at a time at first.

When you are able to send the individual letters and numbers correctly, start sending short words. Now, besides the internal spacing, you must watch that between letters and words. The spacing between letters is equal to three dits or one dah. Authorities differ slightly on the correct spacing between words. The older standard was five dits, while the newer tendency is to make it equal to seven. The greater spacing is somewhat

A diDAH
B DAHdididit
C DAHdiDAHdit
D DAHdidit
E dit
F dідіDAHdit
G DAHDAHdit
H dididit
I didit
J diDAHDAHDAH
K DAHdiDAH
L diDAHdidit
M DAHDAH
N DAHdit
O DAHDAHDAH
P diDAHDAHdit
Q DAHDAHdiDAH
R diDAHdit
S dididit
T DAH
U dідіDAH
V dididiDAH
W diDAHDAH
X DAHdidiDAH
Y DAHdiDAHDAH
Z DAHDAHdidit
1 diDAHDAHDAHDAH
2 dідіDAHDAHDAH
3 dididiDAHDAH
4 dididididiDAH
5 dididididit
6 DAHdididit
7 DAHDAHdididit
8 DAHDAHDAHdidit
9 DAHDAHDAHDAHdit
0 DAHDAHDAHDAHDAH
Period: diDAHdiDAHdiDAH.
Comma: DAHDAHdididiDAHDAH.
Question mark: dідіDAHDAHdidi.
Error: dididididididididi.
Double dash: DAHdididiDAH.
Wait: diDAHdididi.
End of message: diDAHdiDAHdi.
Invitation to transmit: DAHdiDAH.
End of work: dididiDAHdiDAH.
Fraction bar: DAHdididiDAHdi.

easier to copy; nevertheless millions of words have been received with a spacing of five dits. In any event the spacing between words should never be less than five dits, and slightly more will hurt nothing.

From now on devote part of each practice period to sending, not fast, but well. Any time you find yourself tightening up over certain characters, go back to the fundamental exercises for a few minutes.

Proper Practice

Your progress depends on you from now on. Practice and more practice is all that will do it. Keep each practice period brief, but make them often. Besides copying what your tutor sends, it is well to supplement it by copying over-the-air signals over your receiver so you will become used to copying all kinds of fists under actual conditions of interference and static. And from time to time, commit the other punctuation marks to your memory.

The above method is ideal when you have a skilled teacher available to give you unlimited assistance. A slight modification of it is necessary when studying in conjunction with another student. As before, memorize the code with the assistance of a third party. If you teach each other you will unavoidably learn the code visually, which, we say again, is a definite handicap in learning to copy aurally. Once the code is memorized you proceed as outlined above, except that you take turns in sending to each other from the start. Progress will be slightly slower until you have acquired some sending skill. After that it should be the same as when working with a tutor.

If you must study alone your problem is more difficult, but by no means hopeless. Make every effort to get help in memorizing the code. Then comes the hardest part of solo study: covering the gap in speed between one or two wpm and eight wpm. Very diligent search over the amateur bands is necessary to find a station sending slow enough to allow even a single letter to be copied. Occasionally amateurs, especially on the 14-mc band, call DX stations at extremely slow speed. Their calls make good practice at this stage, the repetition allowing the letters to be firmly impressed on your mind. Keep listening, and every time you hear a letter you recognize, write it down. Gradually you will find more and more stations which you can copy partially and you are over the hump.

Until this point is reached, it must be ad-

[*Continued on page 76*]

Briefing — Coax, Audio, Hum

Pre-Polyethylene Coax

Prior to the standardized adoption of the RG-/U series of cables using polyethylene dielectric in 1943, many millions of feet of solid dielectric coaxial cable were manufactured using various compounds of polyisobutylene ("Copolene", "Radol", etc.). Some of these cables (such as "PT-5") resemble the newer RG-8/U and RG-11/U polyethylene coax, and might be mistaken for the latter by a casual or uninformed observer. Because these older cables not only have higher initial attenuation but also have very poor aging characteristics as regards attenuation, and because some of this cable is still "floating around", it is a good idea to be able to distinguish between the two. In case you are not familar with them, here is how to tell polyethylene from the earlier dielectrics.

Unpigmented polyethylene as used in RG-/U cables is translucent, greyish in color, and fairly hard. When touched with a hot iron it melts sharply and does not become "tacky". The earlier dielectrics are amber or white in color and are rather soft, being comparable in hardness to the tread on an automobile tire. When touched with a hot iron they become somewhat gummy.

460 Watts of Audio from 211s in Class B

Most amateurs are not aware that the venerable 211, now available as surplus at slightly over $1.00 per copy, makes an economical Class B audio tube for Class C inputs approaching a kilowatt. The tube is rated at 1250 volts max., CCS, but will stand 1350 volts in amateur service with no danger of flashover and negligible reduction in life, assuming that the tube is of recent production.

At 1350 volts the Class B audio characteristics are the same as those published for the newer 8003, which is simply a 211 with slightly better insulation. The pertinent data for 2 tubes at 1350 volts is as follows:

Plate-to-plate load	6000 ohms
D-C grid voltage (fixed)	100 volts
Peak a.f. grid-to-grid voltage	480 volts
Resting d-c plate current	40 ma.
Max. sig. d-c plate current (sine wave)	490 ma.
Driving power	10.5 watts
Max. sig. power output	460 watts

Unless the bias supply and the plate supply have very good regulation, it is advisable to lower the resting bias slightly, so that the resting plate current will be about 80 ma. This will prevent "Class C" operation (with consequent splatter) at maximum signal even when there is an appreciable drop on plate voltage and increase in grid bias.

Reducing Hum In Low-Level A. F. Tubes

A-C hum generated in cathode type tubes used as noise limiters, grid-leak detectors, and the first tube in a high-gain speech amplifier often may be reduced to a tolerable value by dropping the heater voltage about 10 or 15 per cent below the rated voltage by means of a series resistor. When one side of the heater is grounded, the series resistor should be placed in series with the ungrounded side.

W. W. Smith, W6BCX

Inside the

SHACK AND WORKSHOP

Conducted by A. DAVID MIDDELTON, W1CA*

Shield Can For an 813

A lot of the fellows are having considerable trouble in finding shield cans for their 813 tubes. None of the radio stores seem to have them in stock and most of the fellows I know had to buy copper or brass tubing to make their own shields.

In my junk box I found a couple of old coil-shield cans (with bases) that worked out fine as 813 tube shields after the top flange was filed off. I believe a lot of hams all over the country are in the same fix and this idea may help solve the problem of a shield for their 813s.

Mike Pellock, W6UXB

Hemostats for the Ham Workshop

Many hams have seen the handy gadgets known as hemostats used by physicians, with which they can clamp a tonsil, a hangnail or even a stray finger. These little pliers will hang onto a radio part too, just as well as a bit of flesh, and a lot of amateurs have used them to good advantage in radio work.

But where to get a hemostat without paying a big price for one? I had good luck in merely asking my family physician for any old rusty hemostats that he happened to have. You know medical tools must be in A-1 condition, so the Doc let me have a few assorted sizes that he had kicking around his junk box.

What do I care for a bit of rust? The gadgets work fine and I now have several sizes, shapes and types, with curved and straight noses, etc. The handles lock tight on any small part such as a bolt or a nut, and give me a real grip on the problem at hand.

Maybe your physician or surgeon will be as helpful as mine was. Here's hoping.

Bruce O. Cline, W9SXM.

Winding a Coil on a Polystyrene Form

Have you ever wound a coil on a smooth polystyrene form, and then tried to make the turns stay properly spaced until you could get them cemented with coil dope? After several unsuccessful tries I hit upon the following scheme: There was a bottle of Amphenol coil-dope thinner on the shelf. Now, if I could put a band (equal to the width of the spaced coil) of this thinner around the coil form, *before* the turns of wire were put on, the surface of the form would be somewhat softened, and I could wind on the wire before it could reharden. The turns of wire would sink into the softened surface thereby holding them firmly in place.

The idea had merit and seemed worthy of a try and I found that it worked perfectly.

A word of caution: When putting that band of thinner onto the coil form remember to put it on *fast!* I use a wad of cotton saturated with the thinner and go around the form just once! A split-second after the thinner touches the form, the polystyrene softens and becomes sticky enough to get a tenacious grip on anything . . . particularly that wad of cotton!

Cut the wire to the proper length, and drill the two holes in the coil form *before* softening the surface of the form with thinner. Then, after the thinner has been put on the form, clamp one end of the wire in a vise, and pass the other end through one of the holes drilled in the form and then down into the proper prong. Holding the form in both hands, back away from the vise until the wire is under tension. Maintaining this tension, rotate the form, spacing the turns as they are put on. When the proper number of turns are wound, and the end of the winding is opposite the second hole in the form, remove the end of the wire from the vise and put the coil aside until the surface of the form has become hardened. The finished end of the wire may then be passed through the second hole in the form and down into its proper prong. Solder the ends of the wire in the prongs and the coil is completed.

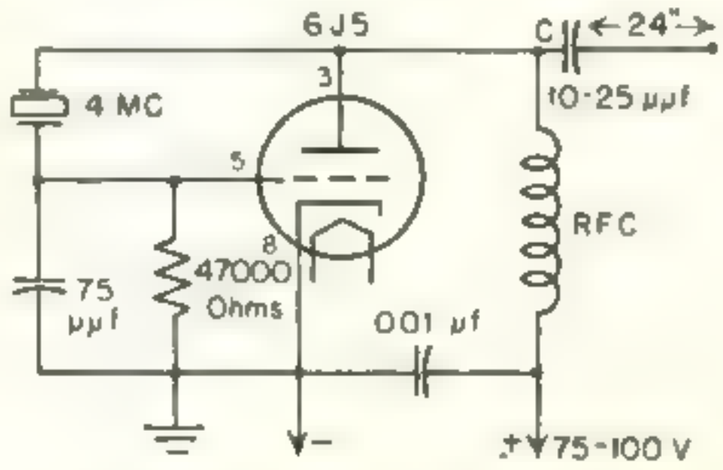
Use only *soft* copper wire for the winding. Wire having any degree of springiness will tend to uncoil from the form after the finish end of the wire has been removed from the vise and while the surface of the coil form is still soft.

Frank H. Tooker, West Orange, N. J.

Frequency Marker for the 144-Mc Band

A 4.0-mc crystal oscillator is an excellent marker for spotting the edges of the 2-meter band, since the 36th harmonic falls on 144 mc and the 37th harmonic on 148 mc, thus indicating both ends of the band.

A triode Pierce oscillator (with less than 100 volts on the plate) has sufficient harmonic content to



knock down the rush in a superregenerative receiver without requiring a 144-mc tuned circuit in the test oscillator, when a short radiating antenna is capacity-coupled to the plate of the oscillator as shown in the diagram. Condenser *C* may be either a small mica, a trimmer, or a couple of turns of insulated wire around the plate lead.

E. Black, W2ESO.

Keep That Soldering Iron Tinned!

If one allows a soldering iron to stay hot for any length of time, while occupied with something else during a construction or repair job, the tinned tip will oxidize rapidly and will require refiling before it can be tinned properly.

Here's one good way to eliminate this: Melt some excessive solder on the properly-tinned face or faces of the tip and place the iron carefully in its holder so that this extra solder does not fall off.

Then, by wiping the excessive solder off just before using the iron again, it's all ready to do the job. The extra solder prevents the air from reaching the tinned tip and thus eliminates the oxidation.

Milton Kalashian, W1XNT.

DREAM BEAM

• • • and all the headaches and backaches that go with it

W. P. PETERSON, WØJRY,* and F. C. MILLER, WØRQS**

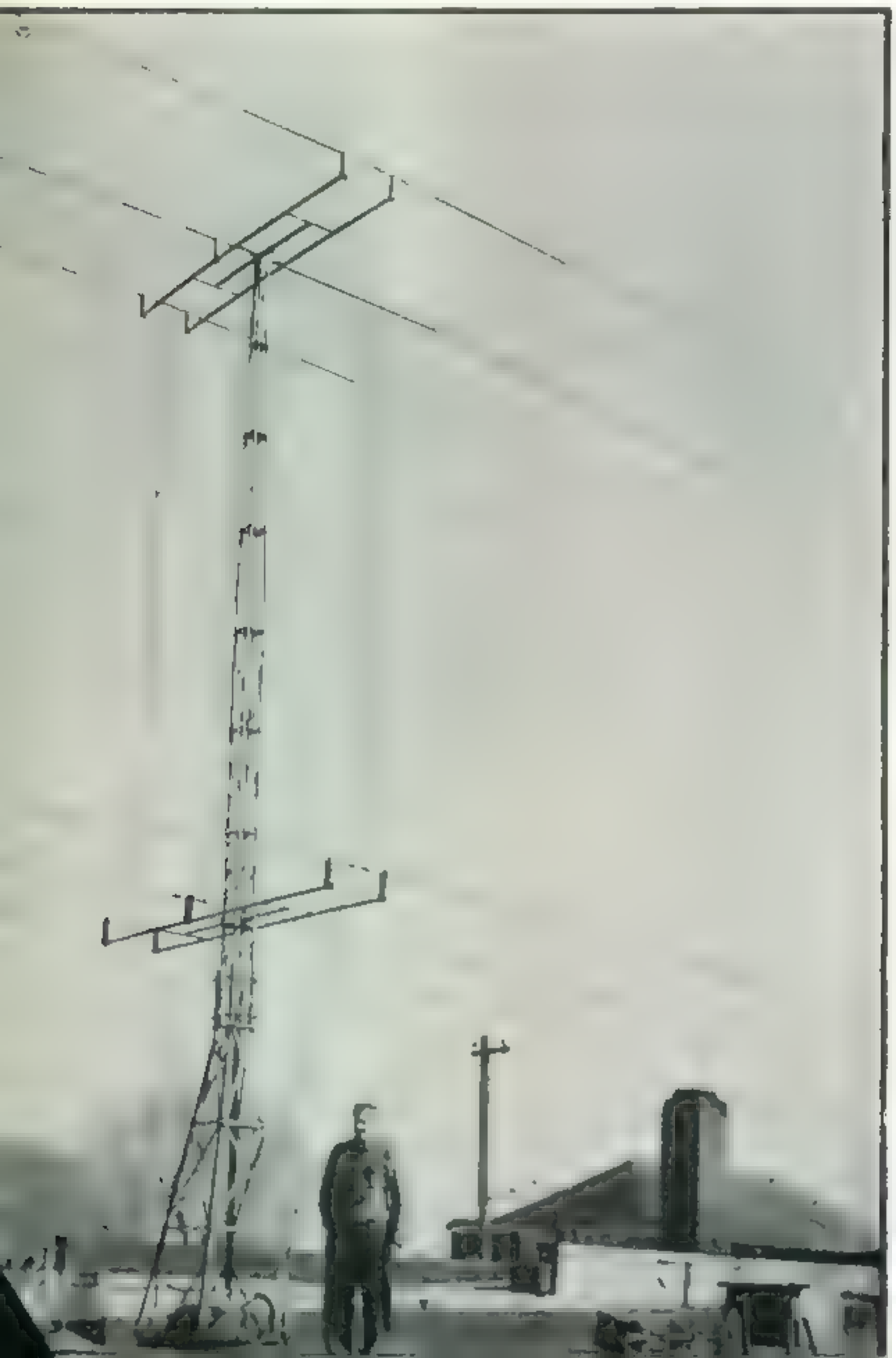
"Is there a ham with soul so dead
Who never to himself hath said:
This is my dream,
My IDEAL BEAM?"

IF THERE BE ANY SUCH, then they are certainly not on ten-meter phone! The wide reaches of this off-again-on-again Finnegan band is populated thickly with beam-dreamers of the most insane variety. If all the ten-meter talk about the merits of this-and-that directional array were laid end to end it would make the venerable Sterba turn over in his grave . . . if he is in his grave. (Incidentally, just what ever happened to that guy, anyway?)

Beam-dreaming is strictly a mental disease, associated mostly with ten meters but sometimes found on twenty meters and six meters, but in a much less virulent form, of course. On ten it is epidemic and occupational. Beam-dreaming, in its horrifying progress resembles the dreaded schizophrenia (expressed less technically: being irrational). The process of going beam-crazy is fun while it's going on, because naturally you do not anticipate the horrible consequences.

So—gentlemen—pull the big switch. Light up a Chesterfield. Cast aside the cares of a hard day hunting parasitics in your surplus 813. Get out your slip-stick and your bubble gum and go adventuring with us out of this world . . . into the star-studded ionosphere of half-waves-in-phase. We will have as our guests on this little journey a small company of reflectors and directors, and a host of other little people who will make our adventure more exciting than chasing moonbeams on a warm June night.

*10 N. 28th, Council Bluffs, Ia.
**5327 N. 52nd, Omaha, Nebr.



10-meter Lazy H with .01 wavelength spaced director and .015 wavelength spaced reflector. The entire tower structure rotates through 360 degrees.

The Conflict

There are two schools of thought on ten meters. They are as far apart philosophically as the Moslems and the Hindus. On one hand, we find the Full-Gallon-and-to-H—l-With-the-Antenna-School. These boys fire up the kw and tack on a folded dipole and bull their way through life on ten. On the other hand, we have the Peanut-Whistle-and-Bless-the-Ten-Element-Beam-School. These fellows go in for 807s, and not a few of the bolder members sport an 814, and perhaps its big brother 813. They rely on direction power rather than bull power.

Now there is something to be said for both schools. In fact, the bright idea occurred to our hero, WØJRY, that it might be well to combine

the best features of both schools as many have done in the bright hinterlands of sunny California.

It seemed logical, then, to procure the services of a kw in the form of a pair of 450THs, modulated by 250THs, Class B. This was done. Since this is an article about a Dream Beam there is no need to bore you with the anguish associated with building up a kw. We will let that pass.

With a full gallon to start with, JRY's beam dreaming began in earnest. The disease broke out in the form of a 3-element plumbers "delight," which is, of course, the kindergarten of beamdom . . . a little practice session to learn how to screw gas pipe together and exhaust the possibilities of the T-match, the Y-match and various forms of unorthodox matches involving open lines, coax, lamp cord, inductive coupling, slip rings, mercury pools, rotating devices, and so on. This primary education in the University of the Beam was very interesting — elementary of course, but instructive to our hero. The kindergarten period was followed by first grade, full time instruction involving wide spacing, close spacing, adding elements, subtracting elements, and so on.

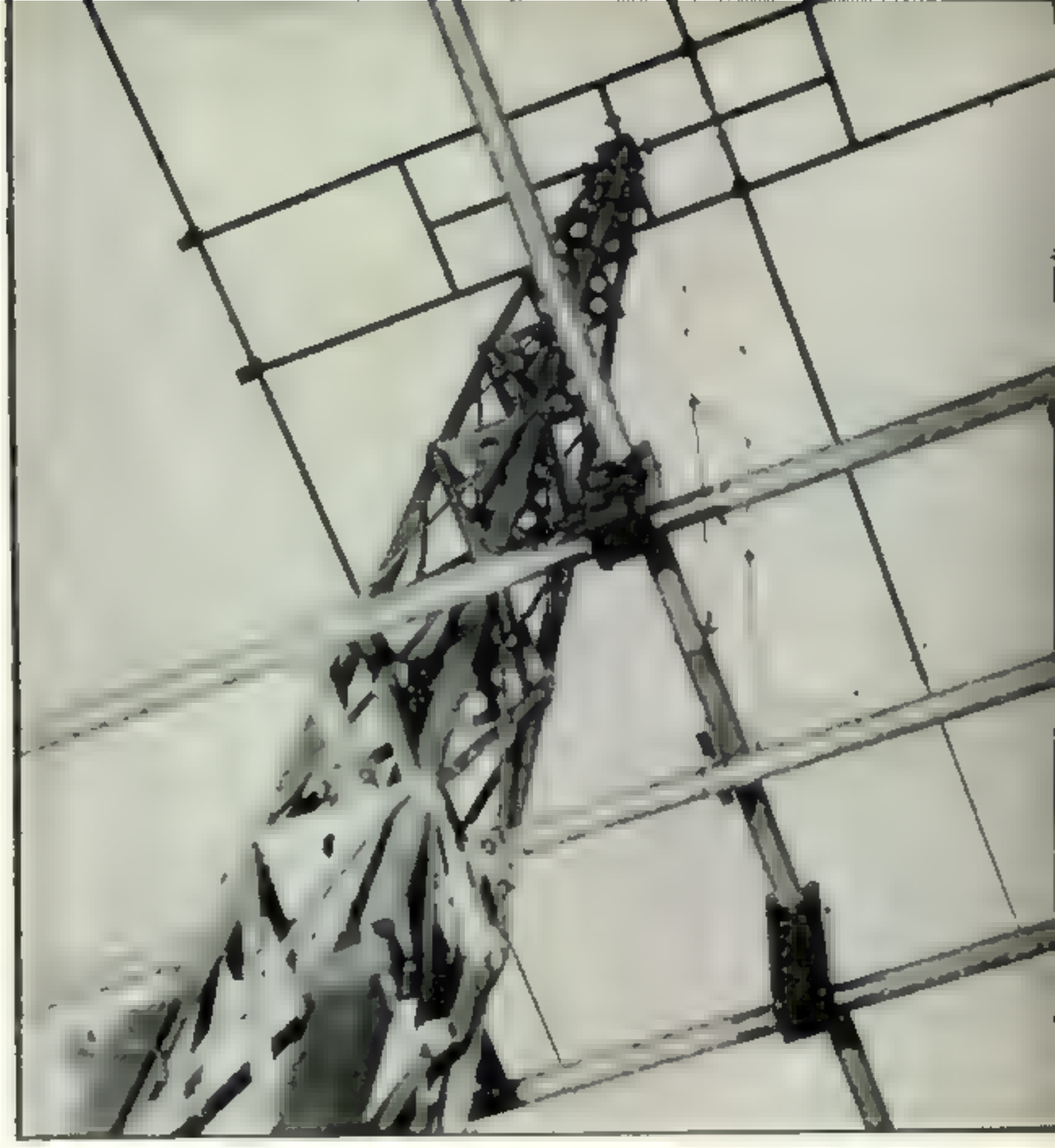
The course in Rhombics, Vee's and Sterbas had to be skipped, since a 50 x 50 QTH prohibited first hand investigation of these wire and insulator beauties. And then came the day . . . wonderful day . . . when the instructor said dreamily: "Spring is in the air. This is the time when all ten-meter scholars go beam-dreaming. Your assignment will be to create and build the dream beam of your heart's desire . . . the super, the ultimate, the omega, the high heaven of beamland. Go find yourself a high hill. Leave your handbook behind. Watch the clouds roll by. Dream up a beam, friend. And remember—slipsticks don't count. Beams are dreamed. The superdupers don't come out of books."

He can say that again!

The Great Experiment

From his own experiments and the experiences of some of his DX friends, JRY concluded that his dream beam would be based on in-phase, stacked half-waves, because of low angle radiation characteristics. The simplest form appeared to be the prosaic, old reliable Lazy H. Well and good. The next step was the addition of directors and reflectors. Very simple. It had everything. Low angle, terrific gain, a relatively high impedance for a beam of such enormous forward gain. This was it!

At this point reality stepped in and dreaming got difficult. How the tarnation could such a box car be supported and rotated? What kind of construction would do the trick? Would it stay up in the strong midwest winds? A thousand and one doubts popped up. Ham friends thought



Structural details of array are visible looking up the aluminum and steel welded tower. Element booms are secured with bakelite blocks. Center of beam elements are insulated with 6" length of 1" polystyrene.

the idea was nice but how the heck could you build such a Rube Goldberg contraption and rotate it!

The first experimental antenna built was structurally unsound but it gave this young antenna builder a chance to work the bugs out of his dream. After several months of planning and construction, the Super Duper was finished. It worked—electrically and mechanically—and it has equalled or exceeded the fondest hopes of its designer and builder. The basic unit, as you will see from the accompanying photographs, is a lattice supporting tower of dural and steel, with the necessary supporting arms for the elements. The entire tower is rotated, utilizing a surplus B29 gun turret mechanism.

Some Details

Figure 1 shows the B29 gun turret rotating mechanism. This is bolted to a set of 6 pieces of 1½" angle iron extending 3 feet on the 4 sides of the turret. Also shown in *Fig. 1* is the 1140 rpm a-c motor. The d-c motor was left in place and a pulley replaces the usual cooling fan. A 3-to-1 reduction is made from the a-c motor to the d-c motor with a V-belt drive. An aluminum cover was removed from the motor for the photograph.

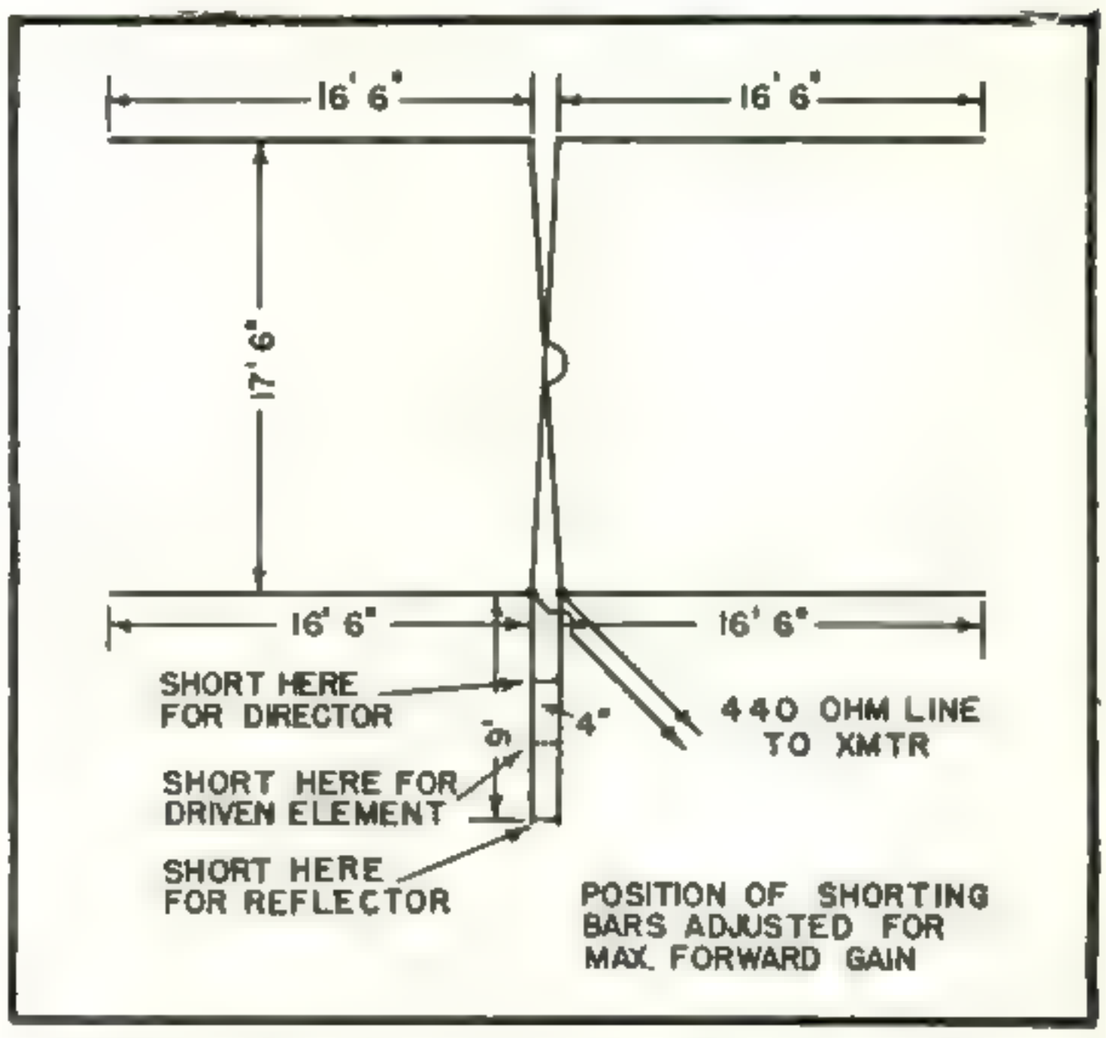
Note that the tower is bolted to the outer rim of the mechanism. The center is stationary and the outer rim is the only thing that revolves.The feed line comes up under the outer rim. In the center of the base, the selsyn indicator is bolted to an aluminum plate. The selsyn serves as a bearing for the mercury pools.

Fig. 1 also shows a flexible shaft coming up to another plate. This shaft is fastened to the top plate and as the beam rotates, drives the mercury pools and selsyn. The feed line comes through a plexiglass plate in the lower base and connects to the mercury as shown.

The bottom section of the tower is made of 1½″ x 3/16″ angle iron. This section is 9½′ high. The upper section of the tower is of 1″ aluminum tube, 24ST. The aluminum portion of the tower is welded construction. The entire tower could be of wood or steel. The cradles or booms that support the elements are fastened to the booms using 2″ x 2″ x 7″ bakelite blocks. These were built up using 3/6″ bakelite sheet. A section in the center of the elements 6″ wide is insulated with polystrene 1″ rod.

The elements are all ½ wave and the phasing section is 17′ 3″. The element spacing is the conventional close spacing: .01 and .015. Overall height is 28′ above the roof and the roof is approximately 18′ above ground. All tuning is done with matching sections 9′ long.

The 440-ohm line is connected at the center of the driven elements. It was discovered that the impedance was lower than 440 ohms (feedline is of this ohmage), therefore a perfect match could not be had on the stub. No means were available for determining the exact impedance, but it is estimated to be somewhat less than 100 ohms. It therefore appears as though there is about a 4-to-1 mismatch—and we are working on this! Actually this mismatch is inconsequential so far as delivered power to the antenna is concerned. Front-to-back ratio appears to be about 21 to 24 db.



Lazy H antenna dimensions are duplicated for reflector and director.

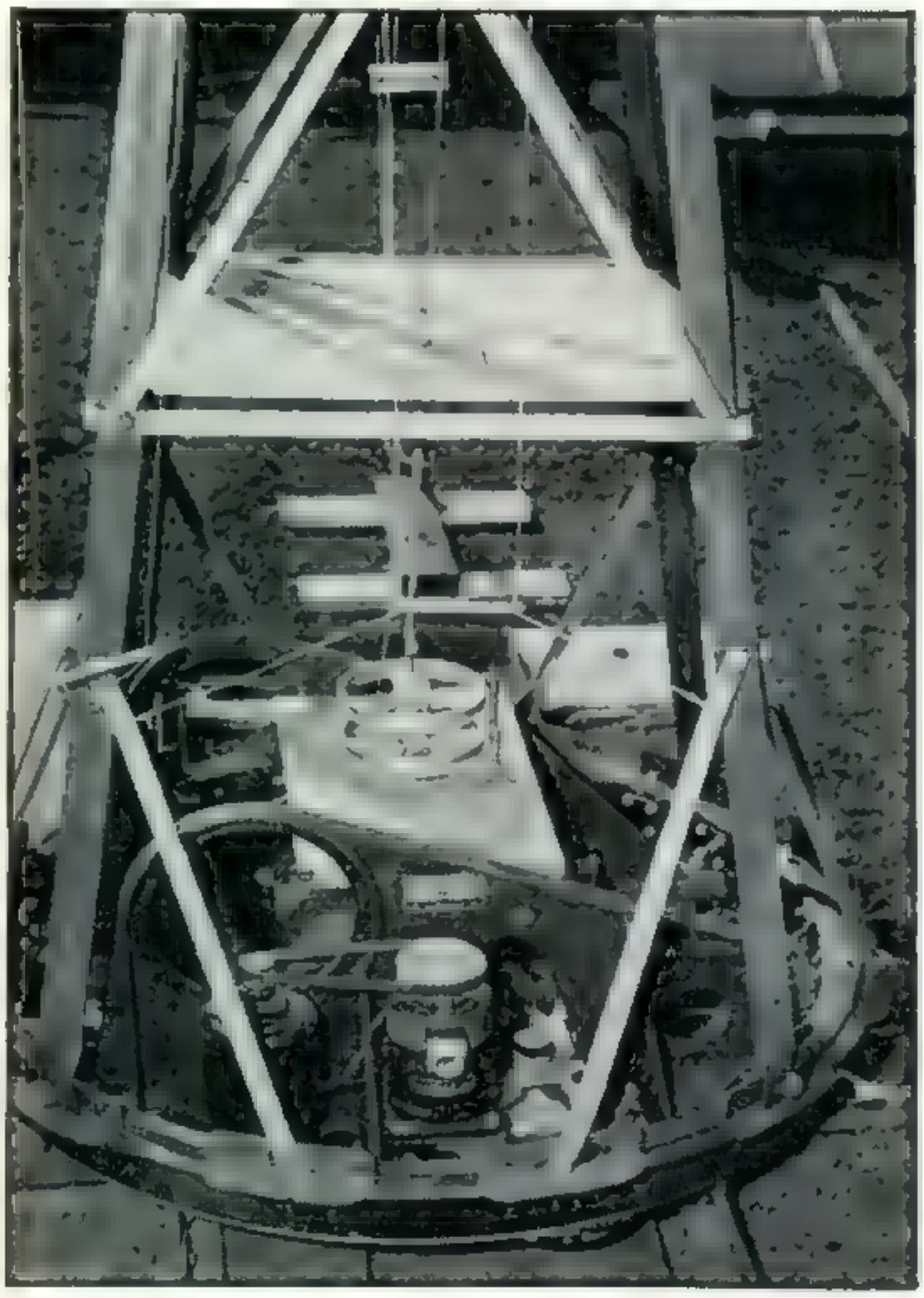


Fig. 1. B29 gun turret, with addition of a-c drive motor, selsyn indicator and mercury contact pools, serves as base of array. Photo is taken with motor housing removed.

Results after about 30 days or so operation on 10 meters, during February and March, 1947, are truly gratifying for operation in this section of Iowa, especially at 28,503 kc . . . the meeting place of the kilowatts. The first four calls resulted in four contracts with VKs, two reports being 9 and two 9 plus. All in all, more than 200 DX contacts have been made and all continents were worked in 6½ hours. Those contacted the same day were G2WI, I1NQ, YV5AC, ZS5D, W2CDJ/J2, W6GGU and ZL1JI.

The photographs will give most of the details of construction. However, the main purpose of describing this beam is to pass along some ideas. Whether you duplicate it or not it may give you some dream stuff to work on.

A local ham friend who works 10 meters in Omaha, Nebraska, just across the river from JRY was reading his mail one evening when the VKs were coming back with glowing reports on the signal. When the band faded down the "friend" gave JRY a call and volunteered this comment: "Everytime you say 'boo' in that microphone some guy in Australia says: 'What goes on there?' Are you satisfied?" The answer was: "Nope. You know I got an idea . . . if you could stack *six* half waves in phase with reflectors and directors, that would be something. Now let me see . . . "

So you see —it's pleasant to go beam crazy. Luckily, JRY doesn't know there's a straight-jacket waiting for him somewhere west of sixteen half waves in phase, 32 reflectors and 64 directors, stacked . . .

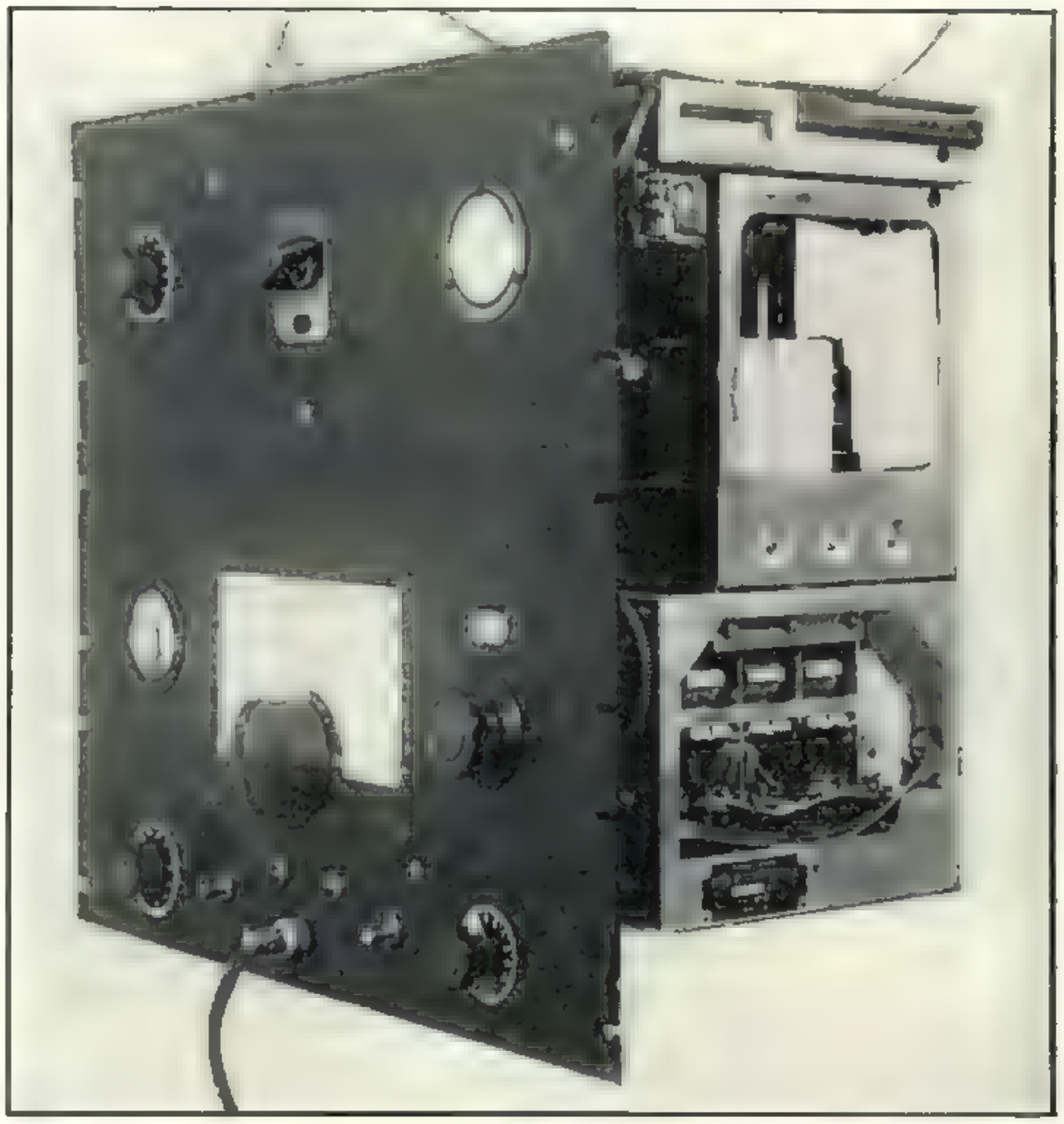
Modification of the

SCR-522 for 2 Meters

M. J. GONDA, W2JBM*

A war surplus natural, the SCR-522 is the hottest 2-meter station combination on the air.

❖ ❖



Front view of SCR-522. All meters, controls and indicators are added as described in modification steps.

SURPLUS EQUIPMENT now available provides the ham interested in v.h.f. with many opportunities to equip his station with excellent radio gear. Before the war, crystal control on the v.h.f.s posed many a problem, but today this may be solved by units such as the surplus SCR 522-542. This unit, which covers 100-156 mc, is ideal for the amateur because of the 2-meter coverage.

For ham work, the receiver can be converted so that the 2-meter band will cover at least 70% of the bandspread dial. In addition, the transmitter can be pretuned to four different frequencies in the 2-meter band, any of which may be selected automatically. A modulator and speech amplifier complete the unit.

The SCR 522-542 is comprised of a transmitter, BC625A; receiver, BC624A; rack and case.

The rack has a tray which contains cables interconnecting the transmitter, receiver, antenna, power supply, control switches, several 12-volt d-c relays, and the channel control motor and mechanism. Sockets and plugs connect the tray and the transmitter and receiver.

Because it is difficult to get plugs to connect cables between the power supply and rack, the simplest method is to take the necessary parts from the rack. If this is done the 13-volt d-c relay supply will not be needed.

Transmitter Line-Up

The transmitter consists of the following: 6G6G, crystal oscillator; 12A6, first harmonic amplifier; 832, second harmonic amplifier; 832, power amplifier; two 12A6s, modulator; 6SS7, speech amplifier; 6SS7, r-f indicator (not included in many units).

The speech amplifier is designed for a magnetic or low-impedance dynamic mike. As described later, the circuit may be easily adapted to use a single-button carbon mike. Reports on the quality have proved it satisfactory.

Castle Radio Co., 677 Euclid Ave., Brooklyn, N.Y.
Photos by W2ETN

The speech amplifier drives the push-pull 12A6s that modulate the screen of the 832 harmonic amplifier and the plates of the 832 final. This arrangement provides 100% modulation.

The dial controls numbered from 1 to 4 from the meter switch are: No. 1—oscillator plate; No. 2—first harmonic amplifier plate; No. 3—second harmonic amplifier plate; No. 4—final amplifier plate.

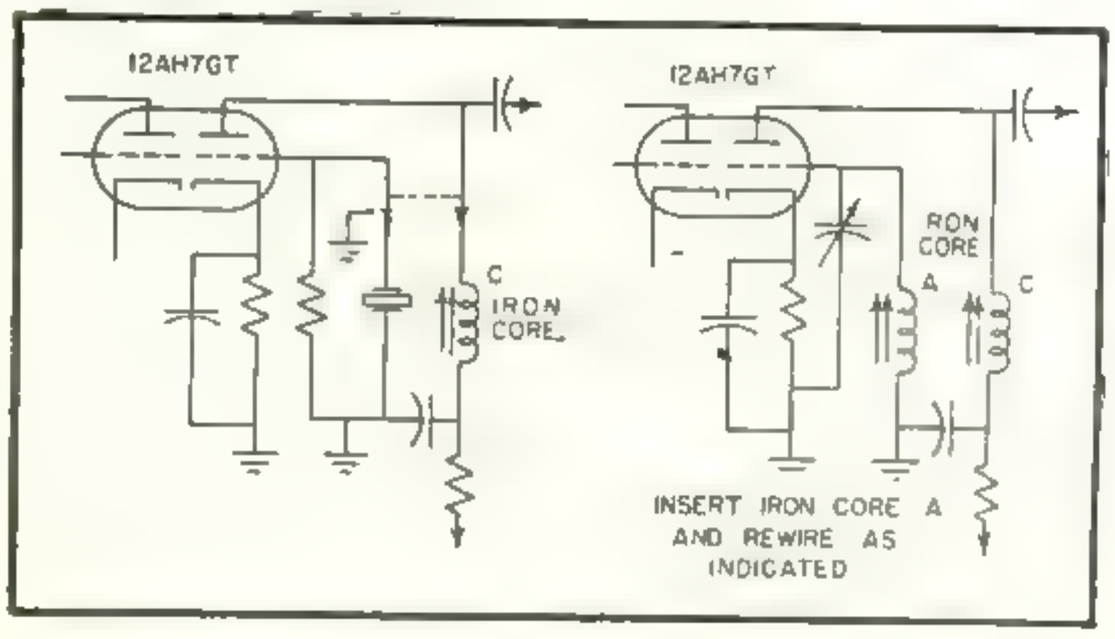


Fig. 1. Circuit changes required to obtain maximum bandspread on the 2-meter band. The iron core is inserted in place of the crystal circuit as indicated in the before and after circuit of the 12AH7GT.

The switch numbered from 1 to 6 connects the 0-1 milliammeter into different sections of the transmitter, at the same time connecting different shunt resistors which change the full-scale deflection readings.

Switch Position	*Current*	*Scale (ma)*
No. 1	First harmonic amplifier plate	0-50
No. 2	Second harmonic amplifier plate	0-100
No. 3	Power amplifier plate	0-100
No. 4	R-F indicator diode	0-1
No. 5	Power amplifier grid	0-2
No. 6	No connection	

Receiver Line-up

As may be seen in the photo, bandspread is read on the National ACN dial. This is coupled to the 25-$\mu\mu$f variable capacitor. To the right of the main tuning dial is the "megacycle control," reading from 100 to 156 mc, which controls the tracking for peak efficiency.

A gear on the megacycle control shaft drives both the oscillator and r-f section variable capacitors. The speed ratio difference for nearly proper tracking of these tuning sections sets a 2⅛-inch pitch diameter gear for the oscillator section and a 2⅞-inch pitch diameter gear for the r-f section. A ½-inch pitch diameter gear connected to the megacycle dial tuning shaft completes the drive.

At the lower right is the audio control and to the left of it a DPDT toggle switch used to control change-over relay No. 412 and the carbon mike voltage. Voltage connections also are made to the red jewel pilot light by this switch in "transmit" position. Directly below the bandspread dial is a male microphone connector.

A 0-10 milliammeter (used as an S-meter) is at the upper left of the receiver panel. Below it is the squelch control. To the right of this is the a-c power supply control switch and the green jewel pilot light.

The 10½" steel panel is fastened to the receiver with 10-32 flat-head machine screws 1⅞ inches long with ⅜ x 1½ inch spacers. Panel holes are drilled to match the threaded holes originally occupied by the red long-shanked screws.

Receiver Conversion

Conversion of the receiver to provide maximum bandspread of the 2-meter band calls for only a few changes as shown in Fig. 1. These can be made as described in the following step-by-step method.

a) Loosen the 4 Dzus fasteners. Place fingers into recess handles of rack and lift the unit clear of the case. Remove the 4 red long-shanked screws, making sure that the slider mechanism is not engaged. If a channel is engaged, release it by squeezing the motor armature until slider is free. The weight of the receiver and transmitter will disengage the units from the rack.

b) With the bottom of receiver up and in working position, unsolder the lead to No. 5 pin of the 12AH7 tube socket connected to the socket terminal, taping end and placing it aside

c) Near the two gang capacitors of the oscillator section are four permeability tuned inductors (iron-core coils) used as oscillator plate resonator for crystal tuned channels (Only one of these inductors is to be used in the plate circuit of the receiver so the three extras may be used elsewhere.) Locate channel "A" inductor (by looking at the name plate on the top side). Unsolder terminal with single lead, tape end and place out of the way. Solder connections between this terminal and No. 5 pin of 12AH7 socket.

d) Unsolder the two wires attached to the other end of the channel "A" inductor and ground this terminal. The two leads are soldered together, taped and placed clear of inductor "A".

e) A 25-uuf variable capacitor is mounted to receiver frame near and above the 12AH7 tube. Connect the fixed plate terminal to No. 5 pin of the 12AH7. See Fig. 1.

f) The next change is in the plate circuit. Terminal No. 6 of the 12AH7 socket has three leads soldered to it. Trace each lead (white with broken blue stripe) that goes to the crystal switch. Cut the lead at the 12AH7 terminal and pull it out to the switch. Now trace the lead (white with red and black stripes) from iron-core inductor "C" to the crystal switch, cut at crystal terminal, re-route through hole to terminal No. 6 of the 12AH7 and solder.

g) Take the 10-contact Jones plug from the rack and press it over the male prong. Solder connections to the following terminals:

No. 8—12 volts a.c., No. 3—300 volts d.c., No. 5—300 volts d.c. (Nos. 3 and 5 can be tied together), No. 7—B minus (ground), No. 4, 7—Small p-m speaker.

h) Antenna feeder (52-ohm coaxial cable) with banana plugs attached to the free ends are plugged into the antenna socket (No. 232) near the r-f tuning control.

i) Set r-f and oscillator tuning control pointers to read 145 mc.

Set iron-core inductor "A" screw one thread below surface and set "C" inductor screw to show one thread above the surface. Turn audio and squelch controls clockwise to maximum setting.

j) After checking tubes and all connections made, apply voltages. As the receiver reaches its operating point, hissing or rush noise level will be heard. A peak in the hissing will be found by turning the 25-uuf capacitor from maximum to minimum. Retune both oscillator and r-f controls, increasing peak of hissing level.

k) After locating a station or two, it may be found that part of the band is above or below the range of the 25-uuf capacitor. To correct this, adjust the "C" iron-core inductor a little at a time, either clockwise or counter-clockwise, checking the position of the tuned carrier or station for each adjustment. The use of an r-f signal generator will make the adjustments much easier. By setting the r-f and oscillator controls at 146 mc, good coverage is obtained from 144.7 to 147.4 mc. Any DX station's signal strength can be increased by peakng the r-f and oscillator controls on the incoming signal frequency.

Additional Receiver Improvements

Before making additional changes, a pencil mark should be made on the rotors of the capaci-

tors in the oscillator and r-f sections with these sections tuned to the 2-meter band. With the rotors at these settings the gears can be meshed and locked. This will save time trying to adjust the capacitors with the gears on.

Continuing the step-by-step explanation:

a) Remove plug-in crystal assembly, cutting all leads. Remove crystal selector switch by taking out mounting screws.

b) Using a Bristol set-screw wrench, loosen the 8-32 set screws between the slider mechanism and r-f oscillator sections. Remove slider mechanism mounting screws. Lift mechanism upward, clearing couplers.

c) The 25-uuf variable capacitor and bracket are mounted so that the capacitor is in the space originally occupied by the crystal assembly. The mounting position depends on the type of dial used.

d) The variable oscillator and r-f gang capacitors require an odd-sized coupler. If a $\frac{5}{16}$-inch coupler is used, it requires a few shims to center the coupler. Another method is to use a 5/16-inch coupler and drill one side to fit. Standard shafts are then used. These shafts should extend $\frac{1}{4}$ inch beyond the receiver and the gears already described are mounted on these extended ends.

e) With the oscillator and r-f gears in place, the megacycle dial shaft and gear are set into position and supported by a bracket mounted below the gear assembly.

f) The audio and squelch controls are transferred to the panel and rewired. If the audio control has no extended shaft, a new 150-ohm control is substituted.

g) The microphone terminal is for a single-button carbon mike. Shield grounded and inner wire connected to either terminal No. 6 or No. 7 of the 18-prong connector of rack, or to terminal No. 1 or No. 3 of transformer No. 158. If a low-impedance dynamic microphone is to be used, connections are made to both terminal numbers at either location.

h) The a-c switch is wired to the power transformer primary and to the green jewel pilot light (110-volt a-c type).

i) For improved performance the 12J5 may be replaced with a 12A6, making the following changes:

1) Replace the 1500-ohm resistor with a 400-ohm resistor between pin No. 8 of the 12J5 and ground.
2) Solder connections between pin No. 4 of the same tube and No. 2 terminal of transformer No. 296.
3) Speaker output can be checked between ground and output transformer No. 296. Terminal No. 5=50 ohms impedance; No. 6, 300 ohms; No. 7, 4000 ohms. The speaker output transformer should match one of these impedances for greatest output.

Transmitter Conversion

The following description gives a step-by-step method for converting the transmitter. Mechanical frequency shifting will be described later.

a) Loosen the Dzus fasteners and lift the rack, releasing the transmitter. Unsolder the three wires connected to terminal No. 2 of the 12A6 modulator tube socket. Take continuity reading (with ohmmeter, etc.) between each of the three unsoldered leads and the terminal of relay No. 13 (top side of chassis) located near terminal No. 2 of the 12A6 tube. The wire showing a direct short is taped and placed out of the way. The other two leads are replaced in their original position and resoldered.

The relay is now without a voltage source, but this may be remedied by connecting an insulated wire between the relay terminal and the No. 8 terminal of the Jones plug 123-1, making available the 13-volt d-c terminal if needed.

b) If a magnetic or low-impedance dynamic type microphone is to be used, no changes are necessary in the microphone transformer circuit. To use a carbon mike, cut connection to No. 2 terminal of the microphone transformer and in its place connect the 3 volts of two flashlight cells, grounding the negative. Disconnect microphone when not in use.

c) The transmitter should now be set in its upright position and a female connector added to the Jones plugs No. 123-1 and No. 123-2. Connections to No. 123-1 should be made as follows:

No. 1—Single-button carbon mike.
No. 1, 2—These are used if an electromagnetic or dynamic microphone is to be used.
No. 8—13 volts d.c. (no voltage is necessary without use of rack).

Connections to plug No. 123-2 are:
No. 1—Minus 150 volts bias.
No. 2—12.6 volts a.c.
No. 3—Plus 300 volts d.c.
No. 4—Plus 300 volts d.c.
No. 8—B minus or ground.

Plug 0-1 milliammeter extension into meter socket. Set switch into No. 1 position. (Note 0-1 milliammeter should be shunted with a precision 40-ohm resistor.)

d) Plug suitable crystal into "A" socket.

e) With all connections checked, the transmitter is ready for tuning.

Loosen tuning control lock-nuts until only slight pressure is exerted on the cam. Set top channel slider ("A" channel) in $\frac{5}{8}$ inch and lock by inserting a piece of wood $\frac{1}{4}$ x $\frac{1}{4}$ x $\frac{5}{8}$ inch into space created by movement of slider near crystal selector switch slide, between slider mechanism support and slider "A." Channel slider pressure will hold the wood in place.

f) With the four dials set near the 145-mc marking, these tuning steps should be followed:

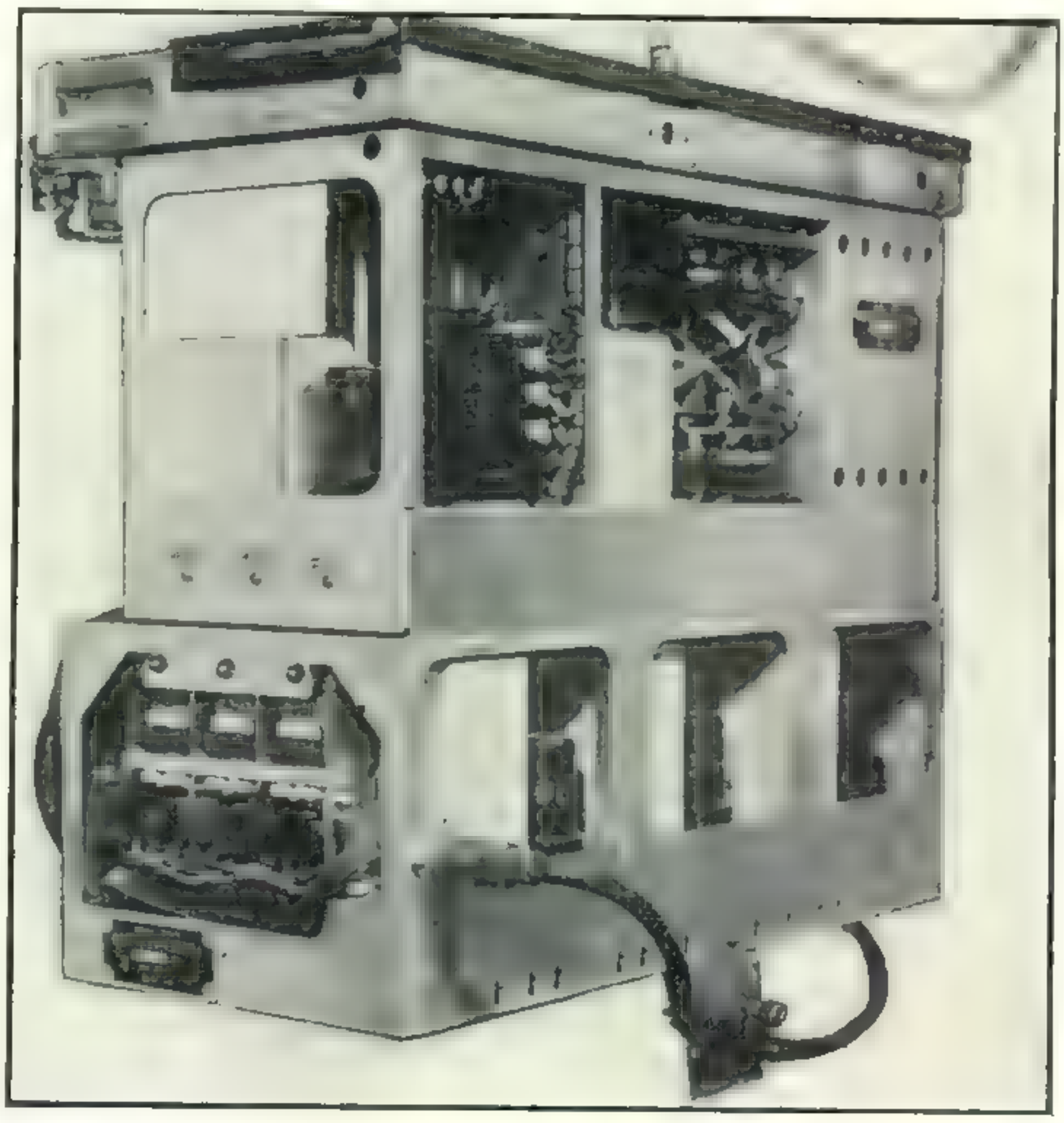
Tuning Control	*Meter SW Position*	*Meter Reading*
No. 1	No. 1	Maximum
No. 2	No. 2	"
No. 3	No. 3	"
No. 4	No. 3	Minimum

g) A 6-8 volt, .25 amp. pilot bulb wired to an extended 2-turn coil should be used to show the point of maximum r.f. while tuning. This also is an excellent means of checking modulation. The brilliancy of the bulb will increase with modulation peaks.

h) With the antenna plugged into the transmitter, tuning steps 3 and 4 are repeated for antenna loading. The meter in No. 3 position should read 6.5 for conservative operation of the transmitter.

Automatic Frequency Shifting

The following information is included for those interested in using motor control for shifting the transmitter frequency. [*Continued on page 72*]



Rear view of SCR-522 complete with automatic frequency mechanism mounted on top of transmitter.

Receiver S-Meter Operation

COMMANDER E. H. CONKLIN, USN, W3VQ*

THE PROBLEM OF the S-meter is not new. It is a problem because many of us are prone to shrugging our shoulders in a what can we do about it attitude. When one looks over the impressive array of post-war communication receivers he may rightly wonder how they compare with the pre-war models. The purpose of this article is not to compare the sensitivity and selectivity of the new receivers, but is written to acquaint the amateur of the two entirely different schools of thought in the operation of a simple device, the S-meter.

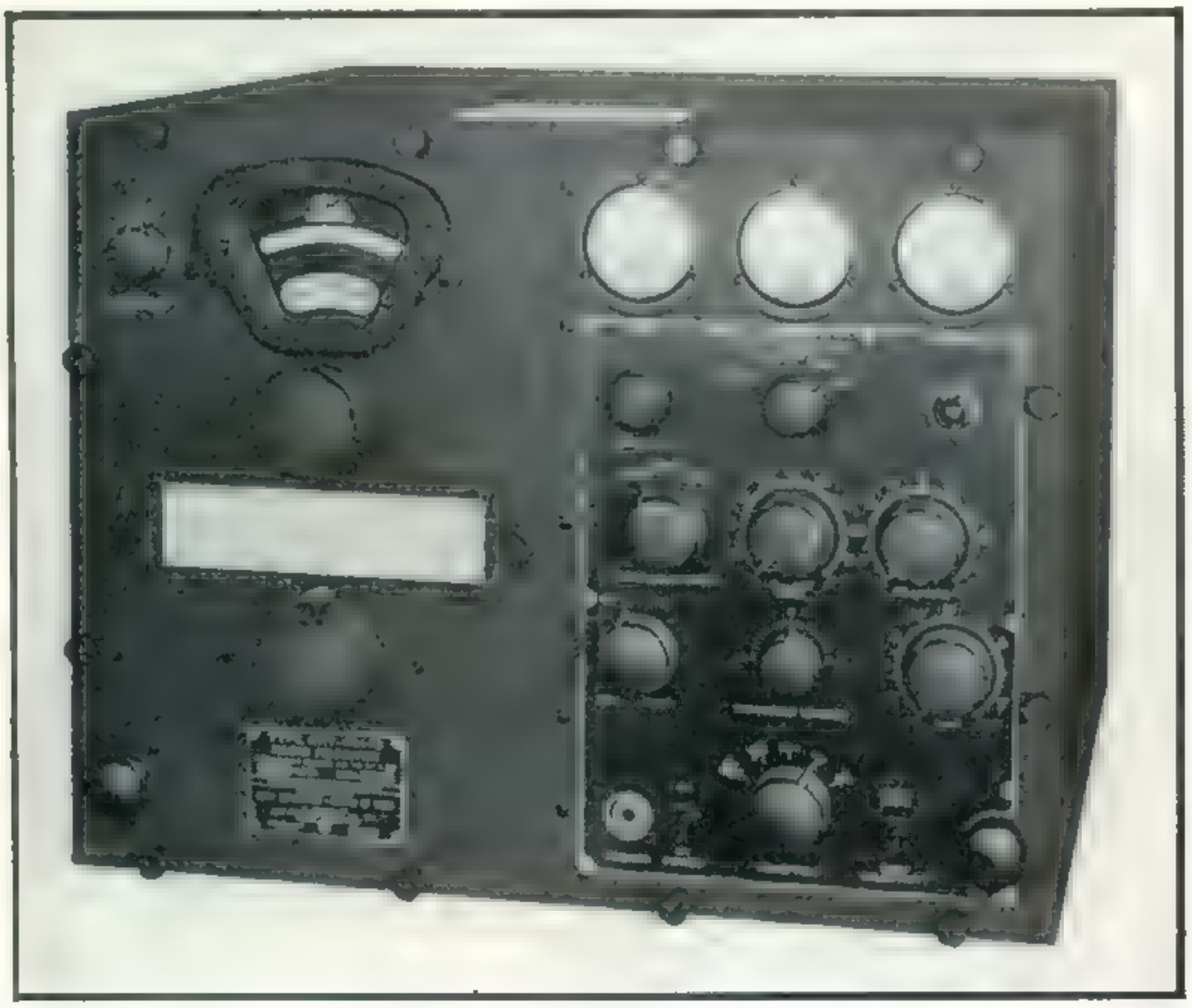
In some cases, the S-meter may bounce around between its two pins like a rubber ball. This for many prospective buyers is very very impressive. On other receivers, the S-meter appears very reluctant to give an incoming signal a fair break and many users are openly apologizing for their low S-meter reports. These two extremes occur every day. Well then what is the value of the S-meter? The truth of the matter is that unless a recognized standard of measuring signal strengths is established which will replace flattery for the manufacturer with honesty in making comparative reports, we must disregard every signal report which is not made on a receiver like the model we ourselves are using.

To prove our contention, it has been possible for the author to test several communications receivers, by injecting a known signal strength in microvolts and recording the S-meter readings.

*6800 Clarendon Road, Bethesda, Md.

The S-meter Experiments

The S-meter tests were made on an identical bench set-up using a Navy model LP signal generator, a wide range attenuator and a dummy antenna. Although care was taken to insure that no unshielded loops of wire would pick up the signal, there are some variables which will make slight variations in the results. For instance, the dummy antenna used may not be exactly correct for the input impedance of each receiver. At times, the signal strength meters could not be exactly adjusted to zero with no signal, and the adjustment is not always the same on all bands. However, for the purposes of this discussion, the results are reasonably close. In all cases, the crystal filters were *off*, although this apparently makes very little difference when the filters are properly adjusted, except at the minimum signal



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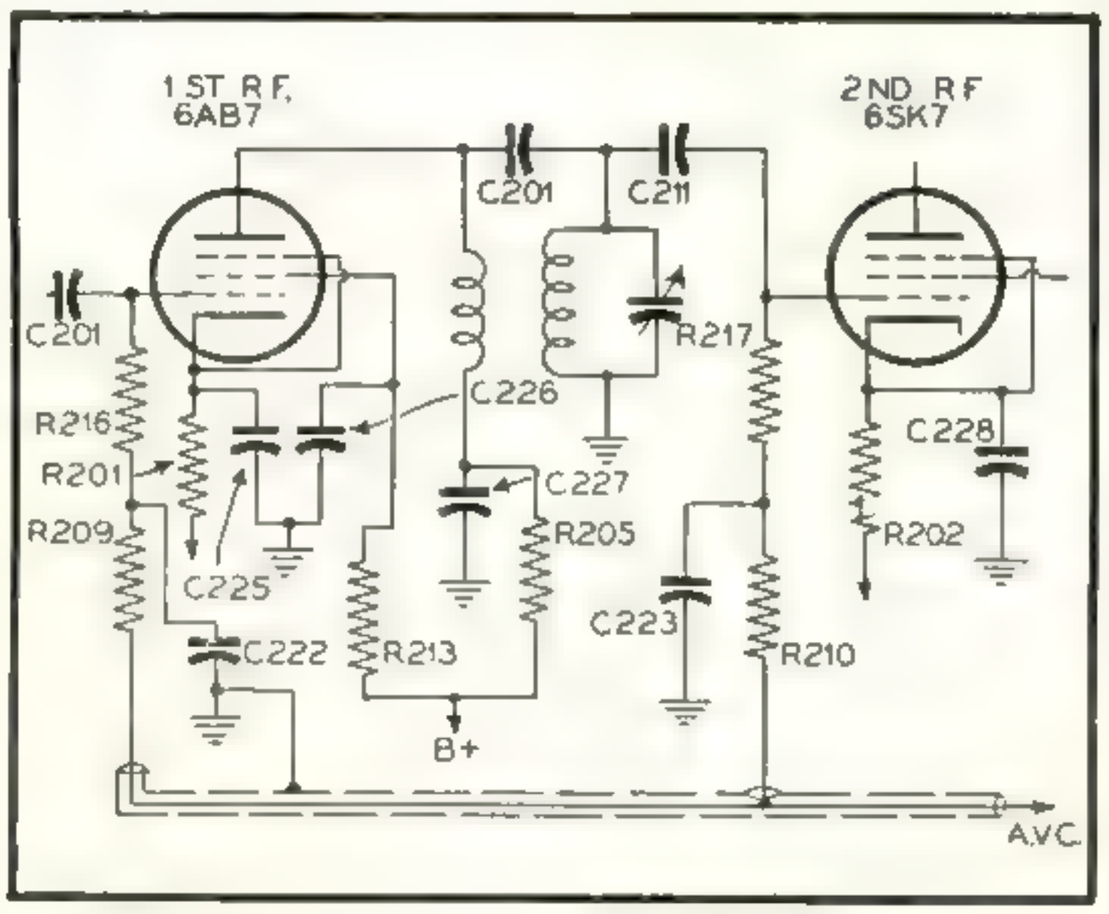
Navy model RBC high-frequency receiver. The input meter is calibrated in decibels up to 120 above one microvolt signal input. The center meter is an audio-frequency output meter. The right hand meter reads d-c volts.

❖ ❖



The method of a-v-c injection in the r-f stages of the Navy model RBC receiver.

C201–0.00005 μf, mica
C210–0.00005 μf, mica
C211–0.00005 μf, mica
C222, C223–0.005 μf, mica
C225, C226, C227, C228–0.01 μf, mica
R201, R202–220 ohms, ½ watt
R205–4700 ohms, ½ watt
R209–0.1 meg., ½ watt
R210-0.25 meg., ½ watt
R213–0.12 meg., ½ watt
R216, R217–1.0 meg., ½ watt
R365–15,000 ohms, ½ watt..

level when the receiver sensitivity is increased by the use of the crystal filter.

Fig. 1 shows the input required to make the S-meters of two post-war communication receivers register S-1 through S-9 and higher. Each receiver has a region marked 40 or 50 db above S-9. Both receivers are in the better engineered and quality group.

It will be noted that the input required to move the meter to each S-point when using receiver A falls nearly in a straight line. The curve averages just under 6 db per S-unit over the middle of the S-meter range. The meter starts up on a relatively weak signal, but it requires a really strong signal to hit S-9 and the higher levels.

On the other hand, receiver B acts very differently. In the first place it requires a moderately strong signal to get the meter to move at all. From then on the rate of increase is about 1 db per S-unit until the signal input for an S-9 signal is equal to the input for an S-4 signal on receiver *A*. The increase in signal input between S-1 and well above S-9 is also nearly a straight line on the logarithmic paper. This means that the number of decibels required for each S-unit is nearly constant over that range, but only a 6 db change input, corresponding to double the field strength or four times the transmitter power, moves the S-meter from S-2 to nearly S-9 as compared with a single S-unit on receiver *A*.

There are certain implications in the wide variations between these two meters. On receiver *B* one might say that a signal is fading several S-units, although in reality, it may be changing less than 6 db. Most signals do fade a few decibels. Furthermore, in the range above S-1, a small change in transmitter power would result in a very substantial change in the S-level indicated on the meter. Any comparisons between two signals on these two receivers would be very misleading. Similarly, when the image ratio of receiver B was checked we found that the signal was S-9 and image was S-1. This has all the appearances of a very good image ratio, but when the S-meter is considered, it is actually a very poor one. The other test receiver however, indicated only a very small S-unit change in the image ratio, but since this occurred near the bottom range of the meter it indicates a very good image ratio.

When the communication receiver is used with a directional antenna the associated high gain will add many decibels to the input reading over a simple antenna on the same signal and receiver. This, too, may be misunderstood since receiver *A* appears to require an input of 10,000 microvolts to read S-9 ,while receiver *B* takes a little over 40! And some signals run up to hundreds of thousands of microvolts! It certainly appears that S-9 reports on the ham bands can mean almost anything.

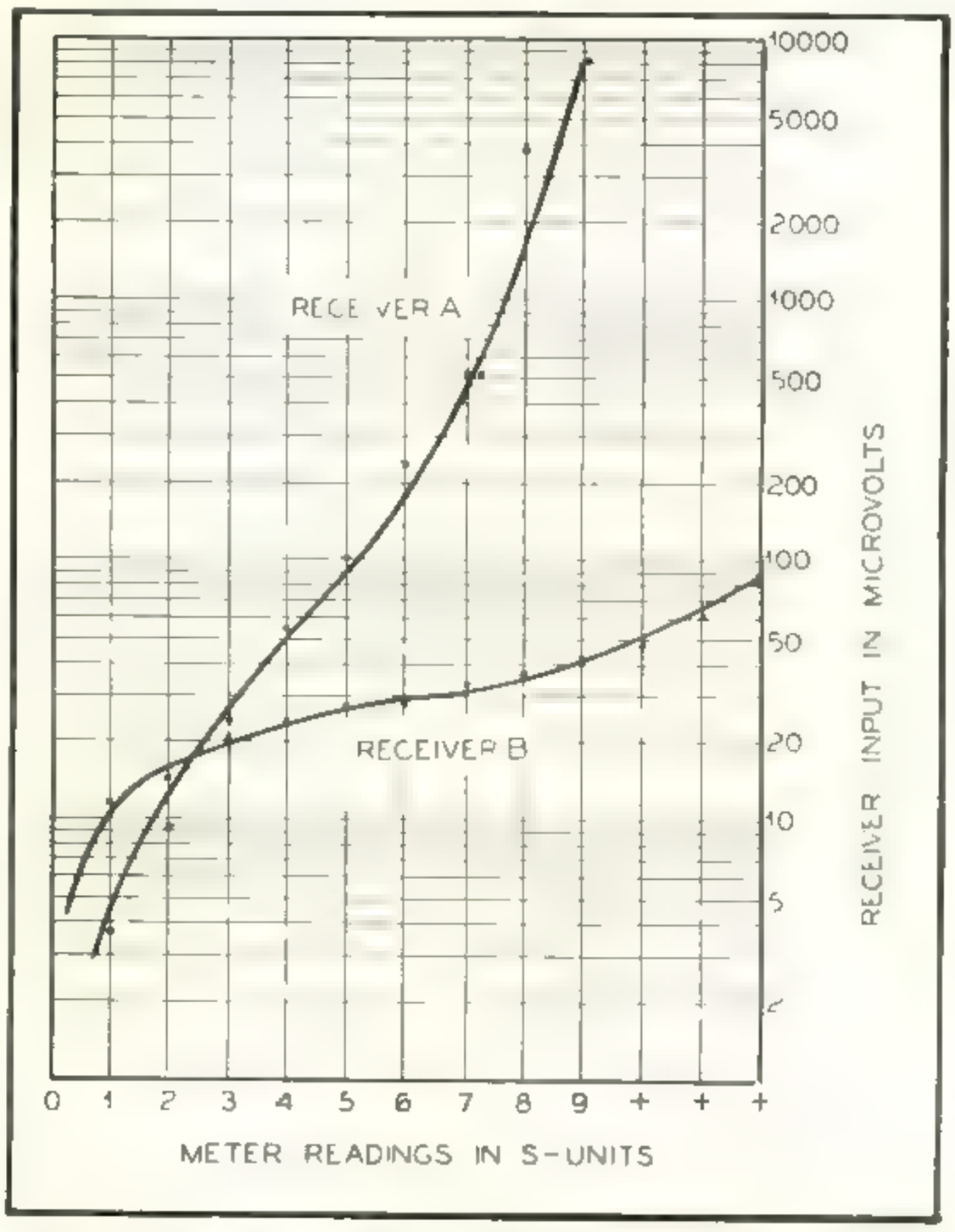


Fig. 1. Input meter readings in S-units, for two post-war models of communications receivers, plotted against receiver input in microvolts.

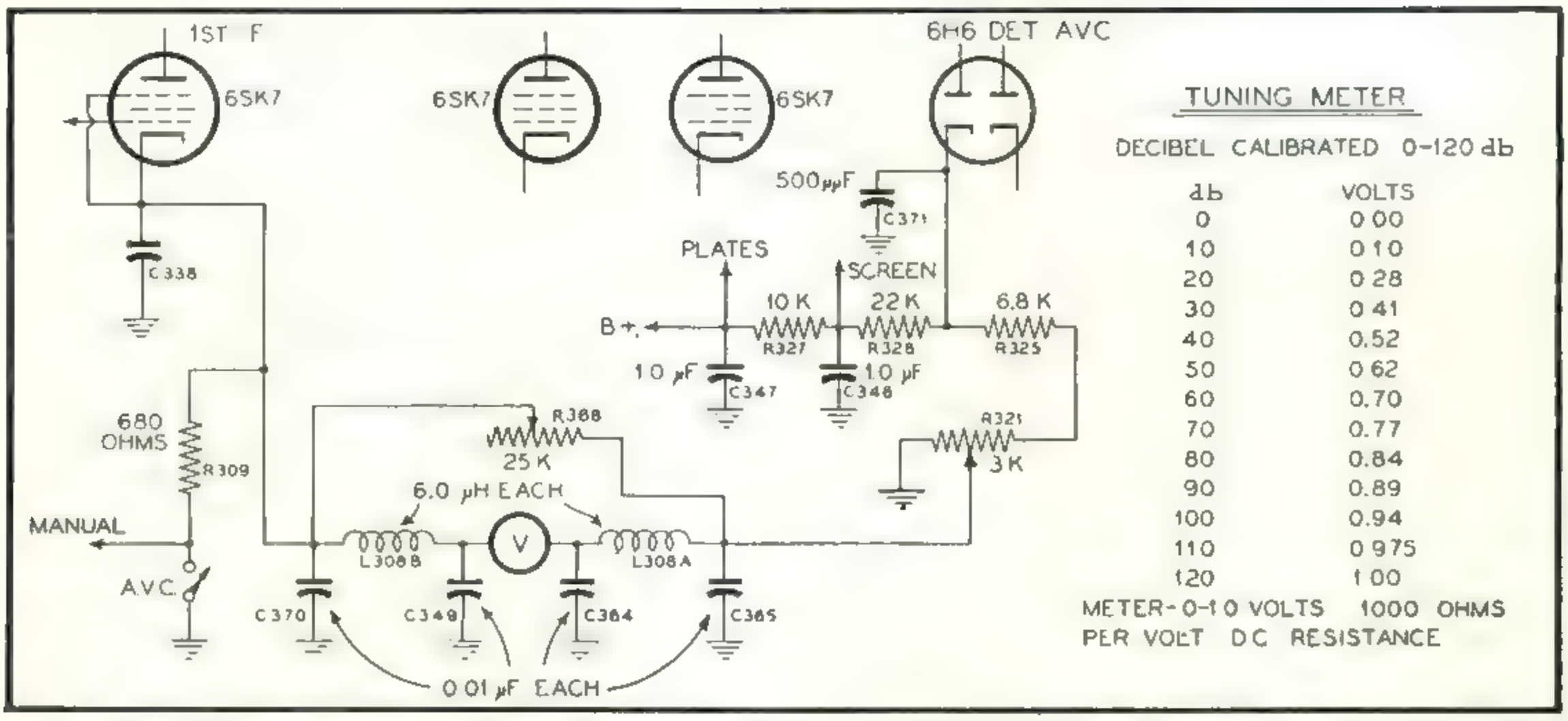


Fig. 2. The S-meter circuit of the Navy model RBC receiver. Note that the meter reads the change in cathode bias of an r-f stage as the a-v-c voltage varies the current through the cathode bias resistor.

Navy Receiver Model RBC

The RBC uses a circuit in which there are two adjustments for correctly setting the *zero* and the *rate of needle deflection* of the input meter. One of these is a zero adjustment and one sets the 80 db level so that the whole scale of zero to 120 db is reasonably accurate. The 25,000 ohm shunting potentiometer (R368) is normally adjusted until a signal of 10,000 microvolts will read 80 db. The wiring of the input meter is shown in *Fig. 2*. The zero reading is set by the

[*Continued on page 72*]

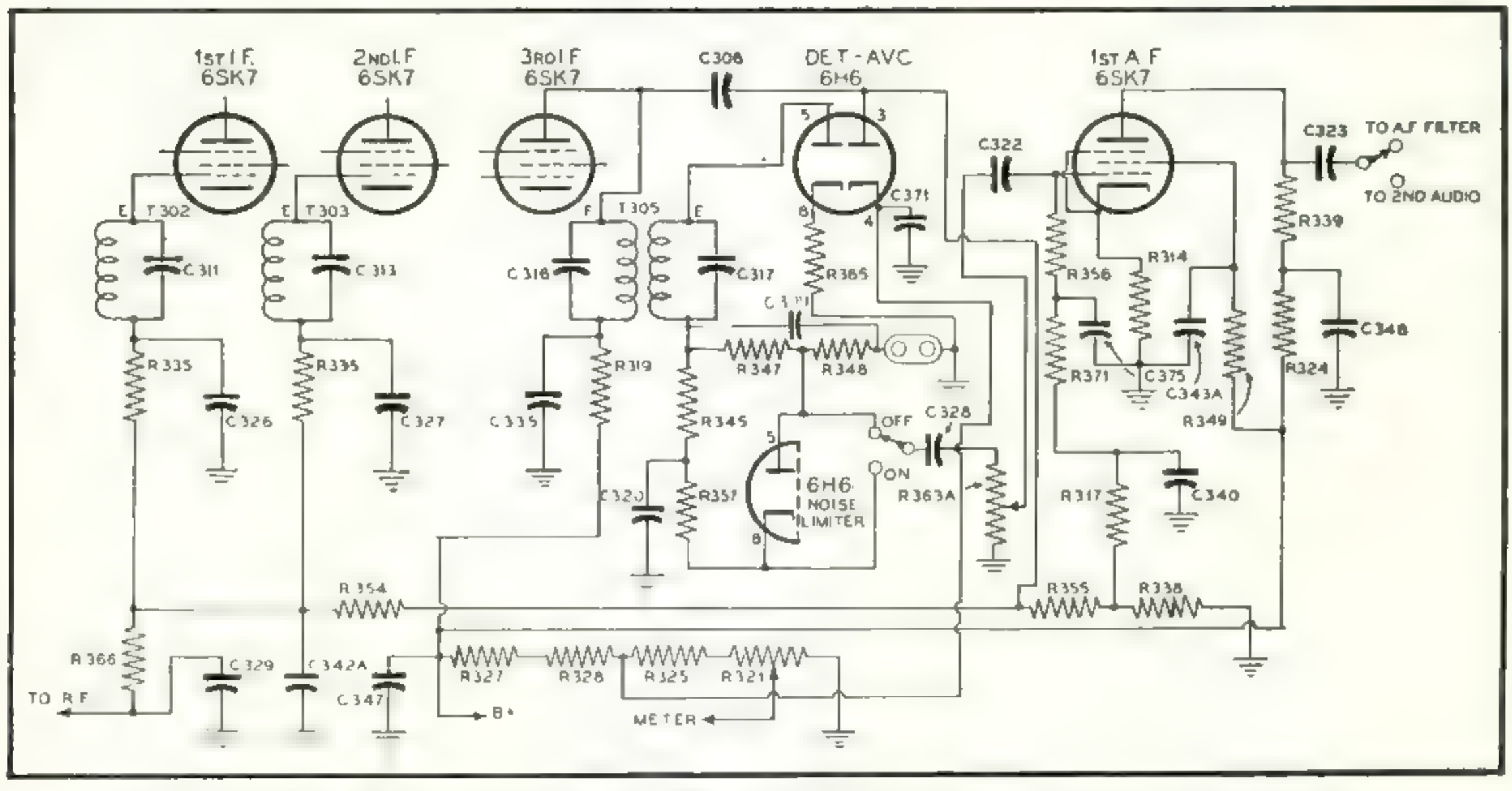


Fig. 3. Simplified schematic of the Navy RBC receiver showing the a-v-c and noise limiting circuits.

C306, C309–0.0001 μf, mica
C308–0.0015 μf, mica
C311, C313, C316, C317, C371–0.0005 μf, mica
C320, C322, C328, C335–0.01 μf, mica
C323–0.002 μf, mica
C326, C327, C329, C340 C375–0.005 μf, mica
C342A–0.05 μf, paper
C343A–0.125 μf, paper
C347, C348–1.0 μf, paper
R314–1,000 ohms, ½ watt
R317, R345, R371–1.0 meg., ½ watt
R319–4700 ohms, ½ watt
R321–3000 ohms, potentiometer
R324–10,000 ohms, ½ watt
R325–6,800 ohms, ½ watt
R327–10,000 ohms, 2 watts
R328–22,000 ohms, ½ watt
R335, R366–0.22 meg., ½ watt
R336, R339–0.1 meg., ½ watt
R347, R348–0.27 meg., ½ watt
R349, R355–0.47 meg., ½ watt
R354–0.39 meg., ½ watt
R356–2.2 meg., ½ watt
R357–0.82 meg., ½ watt
R363A–25,000 ohms, potentiometer
R364–100,000 ohms, potentiometer
R365-15,000 ohms, ½ watt

A Commercial Approach to Amateur Transmitter Design

T. A. HUNTER, WØNTI*

NEARLY EVERY AMATEUR has wished for a transmitter which could be tuned and band-switched like a receiver. If such a transmitter were available, the use of a proper antenna or antennas would make the problem of changing bands very simple. Because the Collins 32V-1 transmitter incorporates these features in a single receiver-size unit, it is of particular interest to the amateur.

Circuit Considerations

Since receiver type of operation was indicated, it then follows that all r-f circuits with the exception of the final amplifier must be tracked. The frequency generating unit used in this equipment is a linearly-tuning permeability tuned oscillator with a range of 1.6 to 2 mc. All multiplier stages must therefore have this same tuning ratio and have a linear tuning curve.

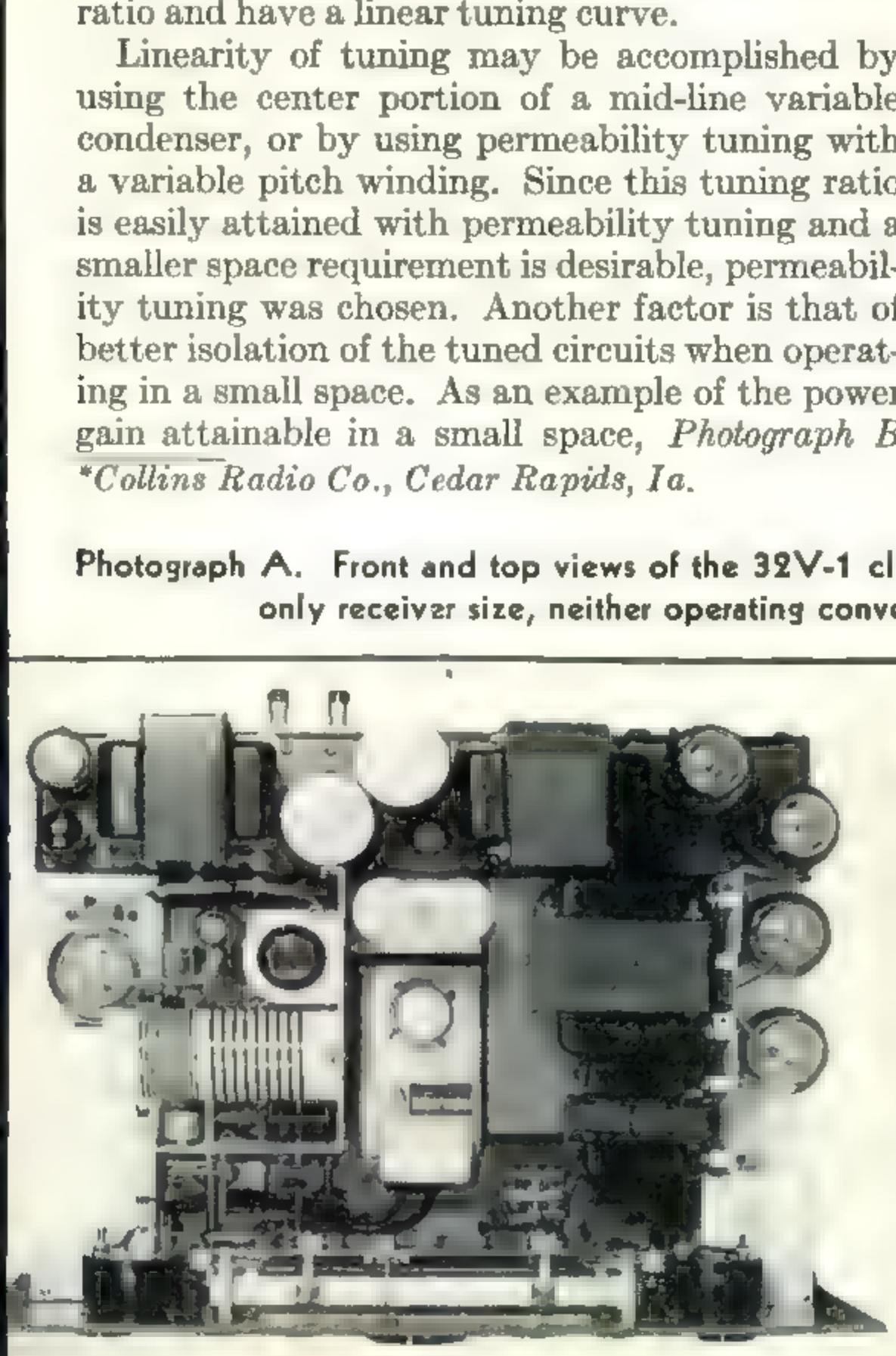
Linearity of tuning may be accomplished by using the center portion of a mid-line variable condenser, or by using permeability tuning with a variable pitch winding. Since this tuning ratio is easily attained with permeability tuning and a smaller space requirement is desirable, permeability tuning was chosen. Another factor is that of better isolation of the tuned circuits when operating in a small space. As an example of the power gain attainable in a small space, *Photograph B* shows the multiplier units and the band-switch. This unit occupies a space nine inches in depth and has a power output of 100 watts. The power gain is very large since the input from the oscillator is of the order of 2 volts (across 3,300 ohms).

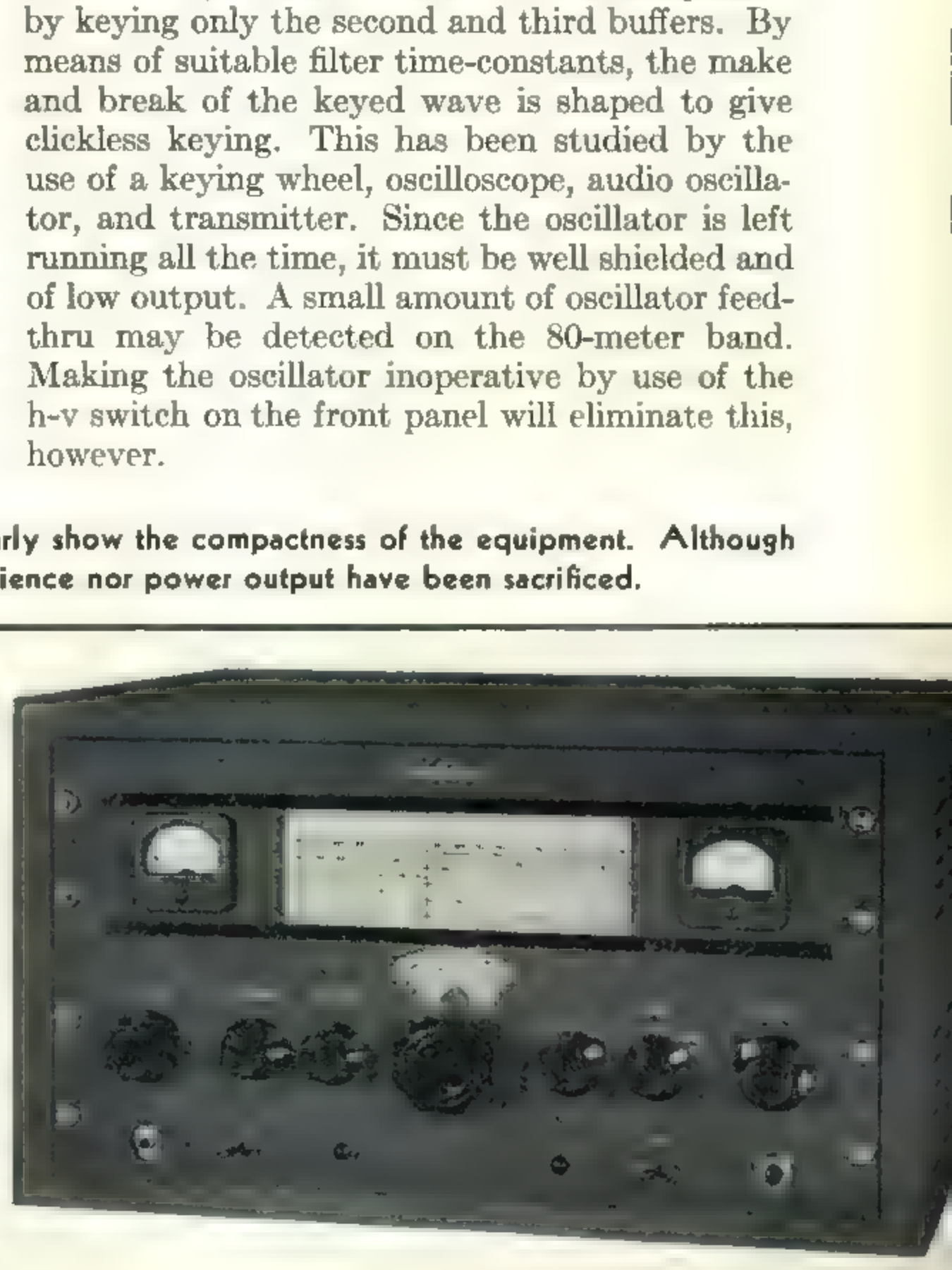
Tube lineup in the 32V-1 consists of a 6SJ7 PTO, 6AK6 untuned buffer, 6AG7 first multiplier, 7C5 second multiplier, 7C5 third multiplier, and 4D32 final. Audio lineup is a 6SL7 audio amplifier (two triode sections in one tube), 6SN7 (two sections in parallel), and 807s Class AB_2.

Keying is accomplished by means of grid block keying of buffer stages. On 80 and 40 meters this keying is done on the first three buffer stages, while on 20, 15 and 10 meters it is accomplished by keying only the second and third buffers. By means of suitable filter time-constants, the make and break of the keyed wave is shaped to give clickless keying. This has been studied by the use of a keying wheel, oscilloscope, audio oscillator, and transmitter. Since the oscillator is left running all the time, it must be well shielded and of low output. A small amount of oscillator feed-thru may be detected on the 80-meter band. Making the oscillator inoperative by use of the h-v switch on the front panel will eliminate this, however.

Collins Radio Co., Cedar Rapids, Ia.

Photograph A. Front and top views of the 32V-1 clearly show the compactness of the equipment. Although only receiver size, neither operating convenience nor power output have been sacrificed.





It should be noted that the Collins 70E-8 oscillator used in this unit is given special consideration in that it is required to act only as a frequency control device. Fewer tubes could have been used in order to achieve the end result, but a good c-w signal which is free of "chirp" and "whoop" requires that the oscillator be operated in a very conservative manner. For those not familiar with this oscillator, the following information is given. A fundamental range of 1.6 to 2.0 mc is used. Sixteen turns of the main tuning dial cover this range. This provides 50 kc per revolution on the second harmonic (3.2 to 4-mc band). The tuning curve is linear within one dial division of the ideal linear tuning curve on any of the bands in the operating range. Tracking is put "on" at 1700 kc and 2000 kc at the factory. Departure from linearity is less than 250 cycles per second between these frequencies.

The audio amplifier consists of 4 tubes—a 6SL7 operated as a cascade amplifier with a volume control in the grid circuit of the second amplifier stage, and a 6SN7 with the sections operated in parallel to drive the class AB_2 807 stage. Five millivolts of audio input will cause the audio amplifier to provide enough power for proper modulation of the carrier. Audio distortion is of the order of 5% when referenced to 90% modulation at 400 and 1000 cps. The noise level is approximately 40 db below 100% modulation. The gain control setting is approximately half way "on" for 100% modulation when using a crystal microphone.

A receiver disabling circuit, remote push-to-talk connections, and 110 volts a.c. for operating an external antenna changeover relay are switched by means of a relay. All connections for these functions are at the terminal strip on the back of the transmitter. These circuits will permit almost any combination of operation which the operator may desire. In addition to these features, a separate section is provided on the bandswitch so that a higher powered final amplifier may be operated in conjuction with the 32V-1. As an example, suppose the operator wishes to have a separate final amplifier for each of the five bands. Switch contacts are available for this type of operation. Thus, by changing bands on the 32V-1 the final amplifier corresponding to the band desired could be energized and placed in operation from the operator's position. These control circuits are not available from the back terminal strip, but can be wired into the transmitter. This switch could also be used for selecting the desired antenna for each band.

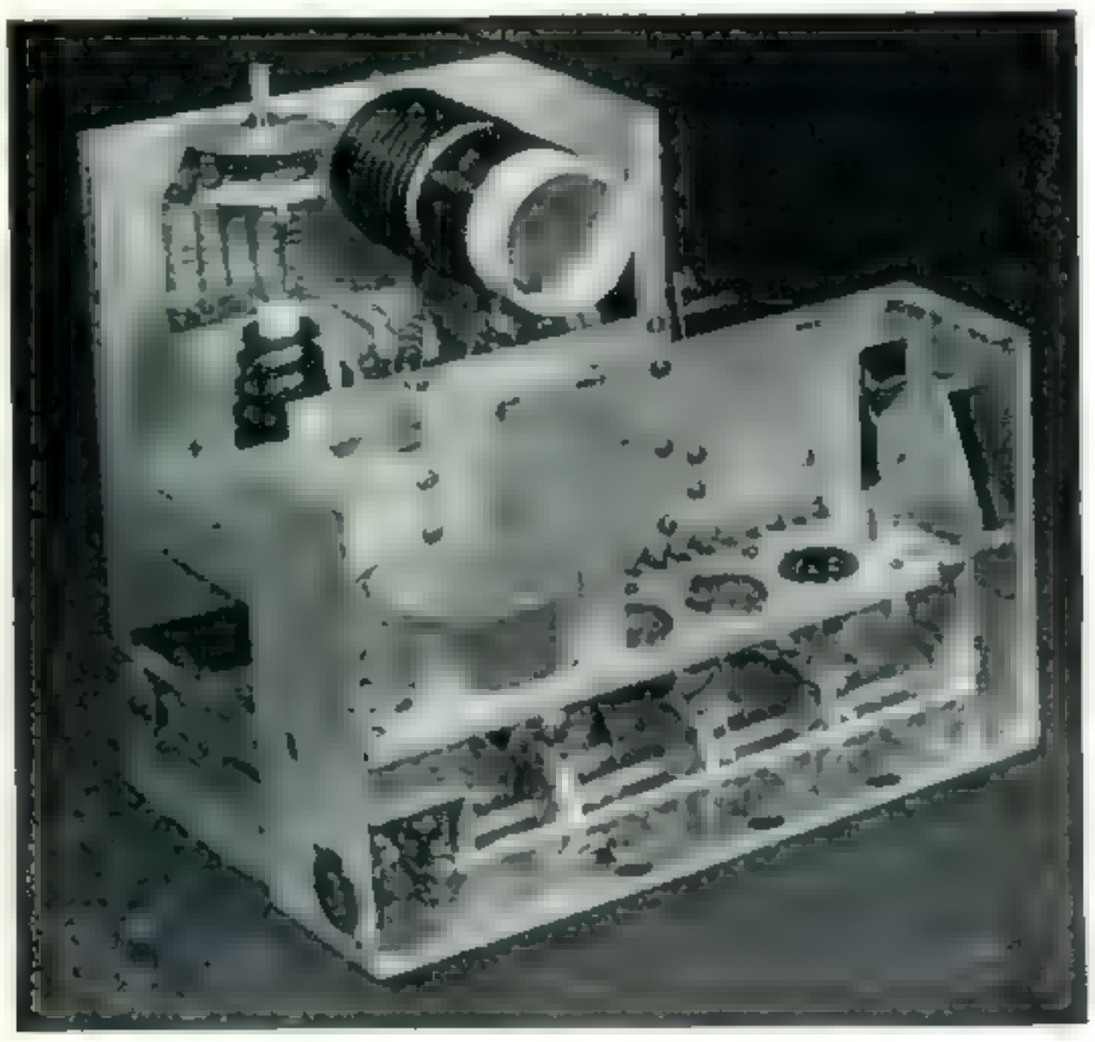


Photo B. Multiplier units and bandswitch illustrate the commercial approach to power gain in the least space.

The two tuning controls are "Antenna Coupling" and "Final Tuning." In order to accommodate a wide variation in antenna coupling, a coarse adjustment is placed inside the set. *Photograph A* shows this control. The control for fine antenna adjustments is on the front panel, and is designated as "Antenna Loading." The final tuning control simply resonates the final amplifier. These two controls are used for loading power into the antenna circuit. Some antennas will require coupling the output to a balanced antenna network but this is not necessary if the antenna into which the transmitter is to operate is properly selected.

Controls and General Information

Some of the controls have already been discussed. On the front view of the unit, from left to right, the controls are as follows: Bandswitch, Final Tuning, Antenna Loading, Main Tuning, Operate Switch, Meter Switch, and Audio Gain. There are two power switches, one low voltage and one high voltage. The bandswitch rotates 180 degrees for each band. Frequency is increased by clockwise rotation of the control. Each division on the main tuning dial covers the following frequency increment: 80 and 40 meters, 1 kc; 20 meters, 2 kc; 15, 11 and 10 meters, 5 kc.

When the unit is calibrated against WWV and the dial set against the movable screwdriver adjustment in front panel, then these frequencies may be relied upon within one division on all bands. This adjustment is normally made infrequently, such as every season. The direct reading band-lighted dial makes it simple to set up the desired frequency. The reading of the vernier dial is added to the reading of the slide rule dial, giving the frequency in kilocycles.

The "Operate" switch provides either phone or c-w operation. The "Calibrate" position is for

[*Continued on page 75*]

A Simple
FREQUENCY STANDARD

RICHARD G. TALPEY, W2PUD*
and
HOWARD B. LEAKE, W2PUN**

SECONDARY FREQUENCY STANDARDS described in handbooks and offered commercially are often deficient in signal strength on the 10-meter band. The development during the war of silicon and germanium crystals for high frequency and microwave use has provided the amateur with a means of obtaining increased harmonic output from low-frequency oscillators. Advantage may be taken of the non-linear (nearly square law) portion of the characteristic of these crystals to provide intentional distortion in order to increase harmonic output.

The fundamental principle is illustrated in *Fig. 2*. The output of an oscillator is coupled by a link to a 1N34 crystal. The non-linearity of the crystal causes large harmonic currents to flow in the crystal and link. Similarly, two oscillators may be coupled to the crystal and harmonics obtained of both oscillators. If one of the oscillators is considerably higher in frequency than the other, intermodulation of the two signals occurs, providing an almost continuous frequency spectrum extending to the very high frequencies. The frequency spacing of these signals is equal to the frequency of the lowest frequency oscillator. Some differences in amplitude are noticed but none of the signals are weak enough to cause difficulty with sensitive receivers.

The standard built using this principle provides 100-kc and 1000-kc points, either separately or together, over the entire amateur range up to 60 mc. Signals from it are about *S7* on ten and better at lower frequencies. The circuit as shown in *Fig. 1* is quite simple and circuit values are conventional. The two halves of a 6SN7GT are employed as the oscillators. One is self-excited at 100 kc and the other is crystal-controlled at 1000 kc. A good crystal should be used to provide maximum dependability. Two links are coupled to the oscillator tanks and fed in series with the 1N34 crystal. The antenna may be connected anywhere in the link circuit, as large harmonic currents flow through the links.

The decoupling from the power lead may not be

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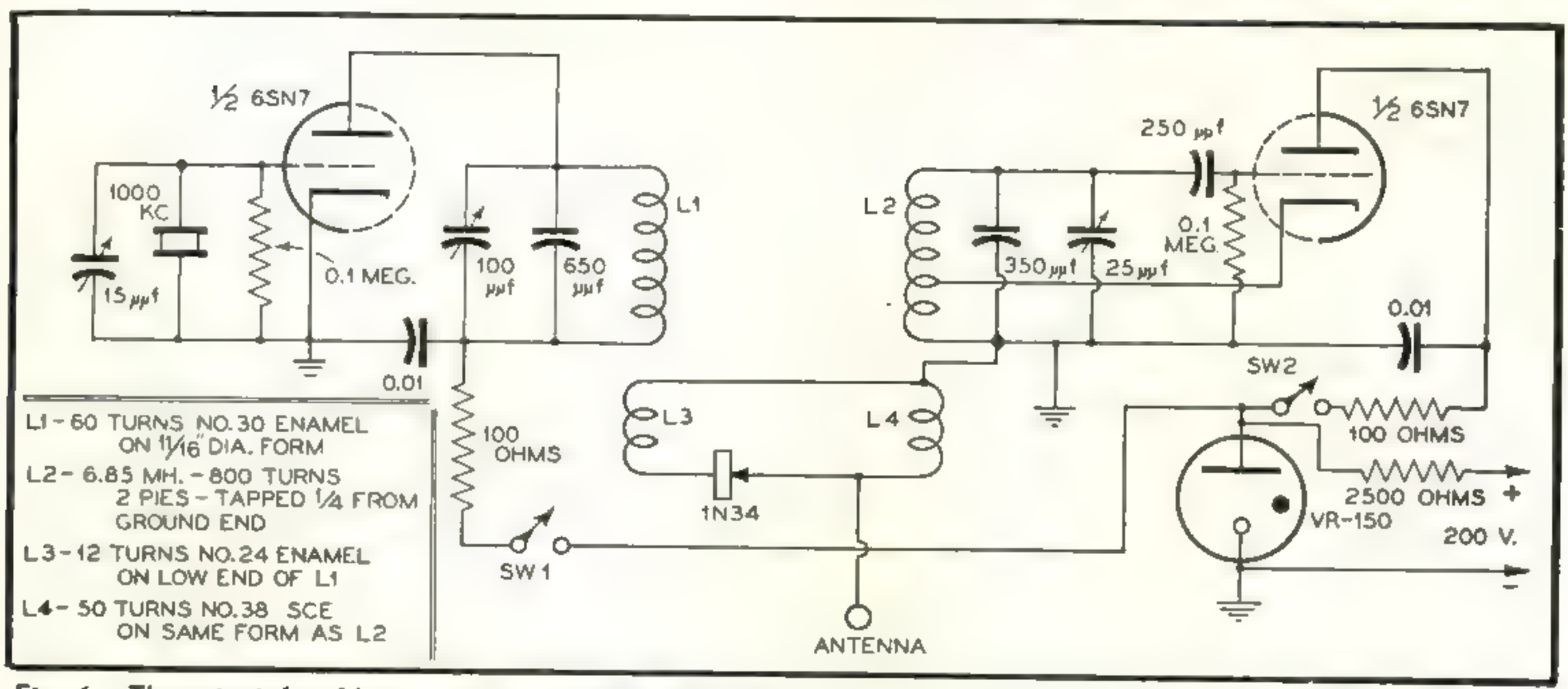

Fig. 1. The principle of harmonic generation with a 1N34 crystal may be applied to any signal generator having a weak harmonic output. Strong harmonics are generated by the non-linear characteristics of the crystal.

❖ ❖

Back view of the frequency standard. The parts layout is simplicity in itself. The tapped choke for the 100-kc oscillator is behind the 1000-kc plug-in crystal.

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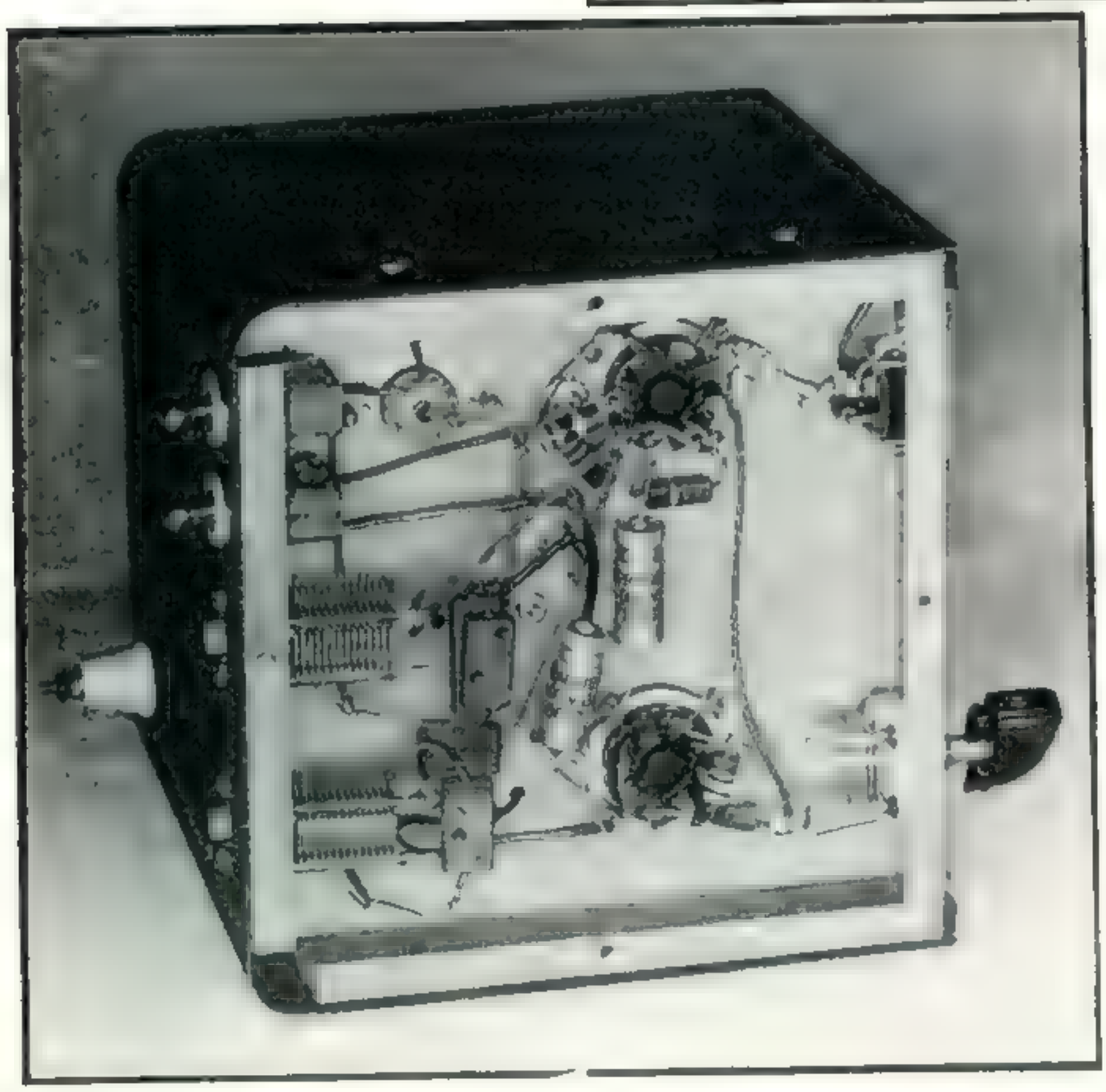

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Bottom view of the simple secondary frequency standard. The small padder condenser C2 extends out the back of the chassis. Tank condensers C1 and C5 are adjusted by screw driver from the front panel.

❖ ❖

necessary, but some difficulty was experienced from interaction and the decoupling provided an adequate cure. A gas regulator tube is used to stabilize the plate voltage. The series resistor for the regulator tube may have to be adjusted to suit individual power supply conditions. About 20 ma should flow through the regulator tube with the oscillators off.

Calibration

Two calibrating adjustments are brought to the front panel; *C1*, a small condenser across the crystal to bring it to zero beat with WWV, and *C5*, a trimmer on the 100-kc oscillator. Some difficulty may be experienced in adjustment if *L1* is not the proper inductance. The coils used in the

[*Continued on page 66*]

Monthly DX Predictions - - - JULY

OLIVER PERRY FERRELL

IT WILL BE INTERESTING to compare the month of July, which represents the low spot in this sunspot cycle maximum, with former summer time lulls in the memories of our DX men. Even between this July and that of one year ago there should be a very marked improvement in DX conditions. It will be noted from the three charts illustrated this month that even the 10-meter band may be expected to be open from 15 to 20% of the total daylight hours over paths to South Africa, Australasia and South America.

Signal absorption in the 80 and 40-meter bands will make these two bands practically worthless for extended range daytime operation. Some absorption effect will probably be noticeable on 20 meters, but not to the extent that it will be observed on either 40 meters or 80. In contrast, it is expected that night DX conditions on 40 meters will remain particularly good with the atmospheric noise level forming the limiting factor.

In the charts shown this month, *Fig. 1* illustrates the average DX conditions from the eastern section of the United States to Australia. The upper variable line denotes the maximum usable frequency (MUF) over this path according to the time scale along the bottom of the graph. The inner variable line represents the optimum usable frequency (OWF) which is generally about 0.85 of the MUF and may be used in conjunction with the time scale to set up schedules, etc. In general, the conditions from the United States to Australia are expected to be fair to poor this month, with a possibility of a slight improvement toward the last week in July and the first several weeks of August. The 20-meter break through around sunrise on the East Coast has now dropped completely below the MUF for that time of day. There is some likelihood that good to fair 20-meter conditions will prevail after midnight EST. On the 10-meter band a possible opening of erratic proportions is anticipated after 1600 hours EST. The peak time for any contacts on the low end of the band is around 2000 hours EST. 10 meters should close around 2100 hours EST.

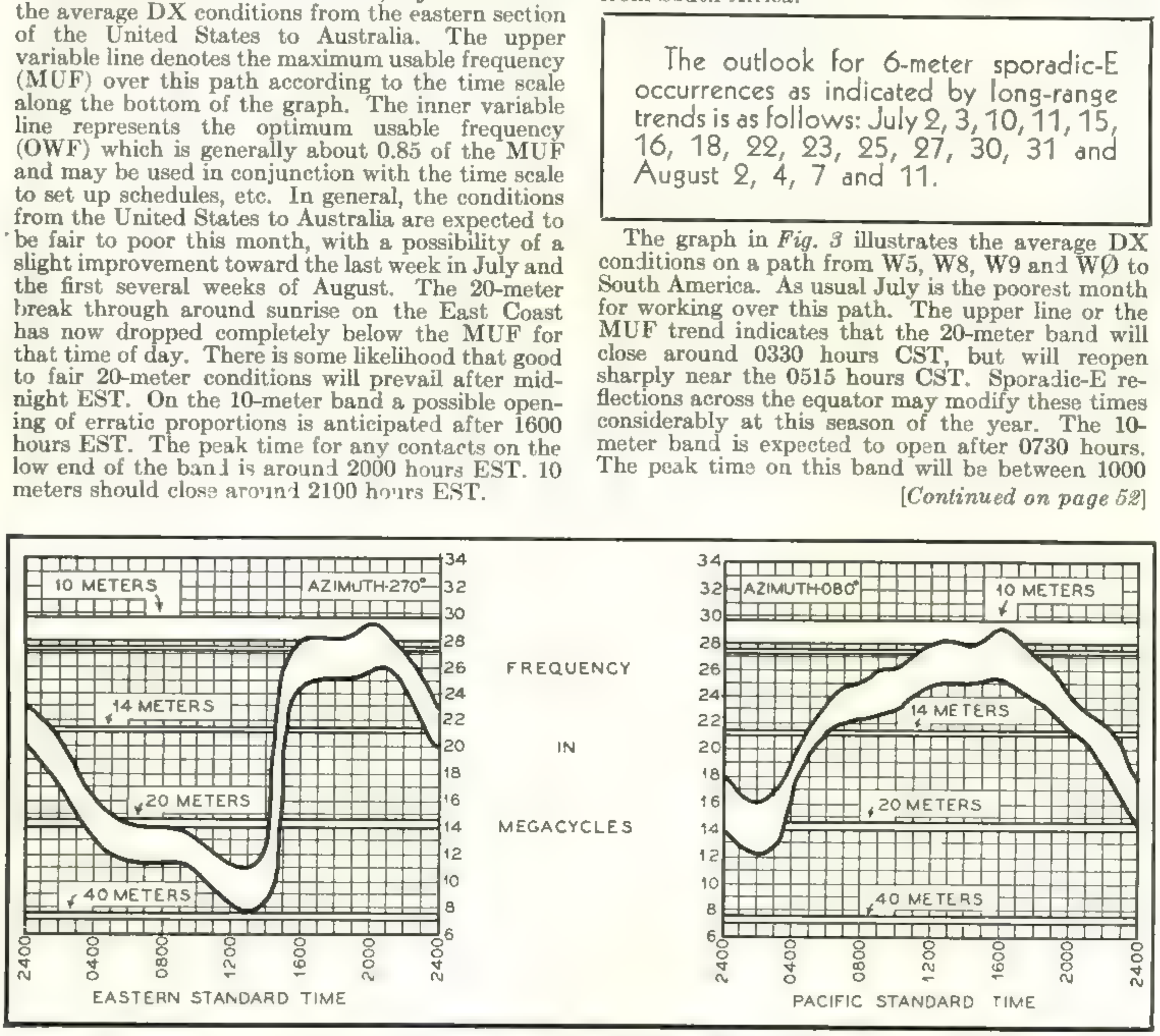
In *Fig. 2* the average DX conditions from the west coast areas of the United States to Central and South Africa are shown. The 20-meter band is expected to be fair after 0400 hours PST until possibly 0700 or 0800 hours PST. Somewhat better conditions are to be expected when a large portion of the path is in darkness, or after 1900 hours PST until about 2400 hours PST. The 10-meter band may be erratic over this path with possible openings between 1300 and 1700 hours PST. Note that this is concentrated around the lower edge of this band.

It is due largely to the characteristics of the ionosphere near the eastern control point of the path in *Fig. 2* that west coast amateurs may use the graph as an indication of the trans-continental conditions between the west coast and the east coast of the United States. Thus at any time when the east coast amateurs are coming through good on 10 meters it might be worthwhile to look around the lower portion of the band for possible DX signals from South Africa.

The outlook for 6-meter sporadic-E occurrences as indicated by long-range trends is as follows: July 2, 3, 10, 11, 15, 16, 18, 22, 23, 25, 27, 30, 31 and August 2, 4, 7 and 11.

The graph in *Fig. 3* illustrates the average DX conditions on a path from W5, W8, W9 and WØ to South America. As usual July is the poorest month for working over this path. The upper line or the MUF trend indicates that the 20-meter band will close around 0330 hours CST, but will reopen sharply near the 0515 hours CST. Sporadic-E reflections across the equator may modify these times considerably at this season of the year. The 10-meter band is expected to open after 0730 hours. The peak time on this band will be between 1000

[*Continued on page 52*]



July 1947 average propagation conditions over two transmission paths. Fig. 1 (left). Eastern United States to Australia and New Zealand. Fig. 2 (right). Western United States to Central and South Africa.

CQ DX

By HERB BECKER, W6QD

[Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.]

THE WAZ HONOR ROLL is adding new members by leaps and bounds. We know business is picking up in this department by the number of Zone and Country Lists we are receiving from you fellows. It is a lot of work to make a neat list, and yet we feel, once you get your end of it done, it will be a comparatively simple matter to send in the additions each month. By the way, try to get them to me by the fifteenth.

By asking for a list showing the information requested, it adds a measure of authority and authenticity. It would be much simpler for us, too, to require you only to send in the total zones and countries worked, but quite frequently we are in possession of information regarding certain stations which are doubtful, or definitely phoney. We know, too, that when you fellows send in your lists, and should they contain any of these doubtful stations, you would not want them counted. Every month someone sends in a letter stating he has found that such and such a station is a phoney, therefore, deduct it from his total. When you fellows hear of a station being NG, please submit the info as soon as possible to us. If we can keep this on the same plane that it was prewar, it will not be necessary to bother any of you for QSL cards, except, of course, when you WAZ. Now let's see what we drag out of the mail bag.

Isle of Man—A Country Again

As we promised you when the Country List was formulated, if a question arose regarding any possible country, we would certainly dig in and uncover all of the evidence we could, after which, it would be weighed. As a consequence, the boys on the Isle of Man have kicked through with a little information to G2MI which changes the status of their little island. In the first place, *QST* and ourselves took the recommendations of the R.S.G.B. as to what they considered a country within their own empire. Subsequently, it has been found that due to the Isle of Man having its own parliament, coinage, and Governor, it should again be counted as a country. To cap all this, they applied to the GPO for a prefix of their own, and they have just been issued "GD." Hereafter, there will be no more G stations on the Isle of Man, but they will be using the GD prefix. Are you happy?

Russian Zones 17, 18, and 19

Many of the DX boys have been slightly confused, except me, and I was highly confused, as to what was going on (regarding DX, of course) in U.S.S.R. Zones 17, 18, and 19. To the best of our knowledge, all UA9s are in Zone 17. Probably one reason for the mixup on the UA9 situation is because, before the war, the U9s were in Zone 18. In any event, I am going to show some stations and the zones in which we think they are located. I hope this will be a help to some of you in determining whether or not you have worked Zones 17, 18, or 19.

Zone 17: *UA9CB, UA9CF*
Zone 18: *UAØSF, UAØUA, UAØKAA, UAØKTU*
Zone 19: *UAØAT, UAØKFC, UAØKQA*

If you happen to work some UAØs, and they mention they are in Chita, or Irkutsk, they are in Zone 18. Stations giving their QTH as Tiski or Sakhalin are in Zone 19. Please let me know if I am wrong on any of the above (as if you wouldn't anyway).

Phone Gossip

G3DO is apparently one of the more active Gs, and he has 36Z and 97C, with an all time total of 36Z and 113C. W2NXZ is a new one in the column with 31Z and 59C. W4CYU worked *UA9CB, XZ2YT, UA1AB, HZ1AB, VQ5DES, VS7MB, CP1AP*, and several others, giving him 35Z and 115C. W8BKP now has 36Z and 106C; those helping are *EA9AI, YS3PL, VR2AL, PK6AS, ZS4P*, and *XZ2YT*. W8BF worked *CR1ØCB, YS1AB*, and *FK8NW*, which are pretty good ones. W6DI worked *PK4HB, CP1AP, FK8NW, EK1AS, VQ5DES, HB9DS, W6RWQ/VR6*, and a nice, juicy, Zone 23 QSO was had with *C8KY*. This gives him 36Z and 110C with an all time total of 37Z and 129C. W1NWO is a new one in the Honor Roll with 35Z and 85C. Another new one is W6PXH with his list of 31Z and 74C. He had a nice QSO with a station singing *OX3GG*, who said he was operating at Narsarssuak, Greenland. He was using an HT4 with 500 watts input, and a couple of receivers; an SX28 and a Super-pro. The frequency was about 14,400, and the QTH information will be found elsewhere in the column. W1MCW adds a few in working *KZ5AN, VS1BJ, VQ5DES*, giving her 35Z and 105C. All of Lou's work is done on 10 phone.

From W9RBI, (ah, there's another W9) we see he has 32Z and 80C. We are glad to see GM2UU getting in the Honor Roll with 33Z and 77C. His all time total is 36Z and 104C. We didn't necessarily save the largest for last place, but anyway, W1HKK sends in a very imposing list with 37Z and 109C. His all time total is 33Z and 121C. Dana said he and his wife spent seven hours going through 12 log books to get all the data for the list of zones and countries. On top of this, he said his secretary

F. A. Griffin, KS4AC, and Bill Wayne, the official log keeper who will soon be on with his own call.

spent two hours typing the list "to make it pretty." You fellows "ain't seen anything yet," you should see what my secretary has to put up with!

Hey, you phone men . . . how about some more news. Let's build up this phone section.

C-W Chatter

W6SA pulled a neat one in a sort of triple play deal, when he worked *CR8AC*. Ed heard *CR7VAL* call and work CR8AC, and when they finished, 6SA called CR7VAL asking him the frequency of this CR8. It was about 14,100, and upon tuning there, Ed heard CR8AC tossing out a CQ. From the grooves in the knob, it looks as though Ed really punched that key in calling CR8AC. Anyway, it was his first "W" station, and needless to say, it was W6SAs first CR8.

Hearing *CE3AG* reminds me of his long experience in Ham radio. He went through the usual stages of the Galena crystal days, did a little transmitting on 200 to 300 meters, and in 1925, he put 440 volts on a UV 202 running 20 watts input. He worked 6 continents on 40-meter c.w. He was the first South American station with a crystal controlled transmitter on phone and c.w., running about 150 watts. He used 20 and 40 meters in 1931. At present, he is using a BC 610E transmitter SX28A with a DB20. The antenna is a Mims 10-20 deluxe rotary.

WØAZT of Denver is up to 31Z and 75C . . . latest zones are *UAØKTU*, *CN8EZ*, *VQ2JC*, and *FR8VX*. In a letter from ZB2B, he says he hopes the W6 and W7 DX men will not tear all of their hair out when he doesn't answer them. He says, in the first place, there is quite a bit of echo on the average W6 and W7 signals, and, in addition to this, QRM from European stations is terrific. So, don't feel too unkindly toward ZB2B, as the guy really wants to give the boys a new country. Maybe, what we need on the West Coast is a good "echo eliminator." The transmitter at ZB2Bs consists of a 6L6 into an 807 with 20 watts input.

W8CVU has worked a few new ones to put him up to 37Z and 104C: the new zone is *UA9CB*. Walt hasn't been on much since the contest, as he says his vertical just doesn't hold up in the usual dog fight that exists. W4DIA is a new one for the Honor Roll with 33Z and 77C. He worked *OH4NF* for his first Fin. W3JNN hopped to 37Z in working *UH8AF*. Six new countries for him include *ZD2K*, *F8NE* Corsica, (how many of you passed him up for just a regular "F"?) *W3EKK/VK9*, *W6NQG/KM6*, *TRIP*, and of course, *UH8AF*.

WØYXO will soon be up to his all time total. Here's what he has now . . 38Z and 112C: all time total is 38Z and 124C. His newest include *YI2AM*, *CR7AD*, *ZD1KR*, *T1NS*, *KS4AC*, and *VR2AL*.

W2BXA sends in a nice impressive list of 39Z and 154C: his all time is 39Z and 168C. W8BKP is up to 39Z and 149C by working *VU7JU*, *VS6AZ*, *FB3AC*, *EA9AI*, *YJ1AB*, *ZD2K*, *W3EKK/VK9*, *KS4AC*, *ZD1KR*, *YS3PL*, and *FT4AN*.

W3EKK/VK9 gives his QTH as the Admiralty Islands. This is the same as the territory of New Guinea VK9. Some of the boys wondered if it should be counted as another country. Neither W1DX, G2MI, or we could see why, as it is a similar deal as other islands groups, such as Bonin, Marianas, etc.

W8NBK has worked some new ones, bringing his totals up to 32Z and 105C, and 34Z and 120C. New ones are *ZK1AB*, *SV1RX*, *VP3JM*, *VS2AL*, *KS4AC*, *ZD1KR*, *HI8MAF*, *W6NQG/KM6*, and *W3EKK/VK9*. WØGKS is up to 38Z and 100C having recently worked *PK6AX*, *VS4BJ*, *HP4Q*,

John Matthews, W3DPA, uses his kilowatt and 3-element rotary to give many a DX station a Delaware QSO.

ZM6AC, *VR5PL*, *KS4AC*, and *XA8G* in Trieste. W6TI worked *UAØKFO* in Zone 19, making 37Z and 92C.

Last month, we related how W5MY had just got in the DX groove, and then transferred to Washington, D. C. Doc's new call is W4MZ. It seems like about the time Doc gets a few zones to his credit, he moves to another district and has to start all over. At least, he can work the same rare DX stations several times, this way, without getting hopped on. W3EVW adds some new ones in *HR1AT*, *HP4Q*, *YI2AM*, and *VR5PL*.

W8FJN is back in there pitching, the result being 38Z and 116C, with his all time total at 38Z and 128C. Roger was in the service for five years, three of which were overseas. He comments on how tough it is to battle through and work the stuff on the air today, compared to 1937. I recall he was high man in the 1937 DX contest in W8, but he thinks that was a picnic compared to now.

W2IOP made fast work of *HZ1AB*, *YI2AC*, *ZC6AL*, *EA7AV*, and *KS4AC* before they cut down the 50′ tree holding up his Zepp. Now Larry will probably put up a real antenna and work some DX.

W9VND had been operating portable in the second district for quite a long time, but now he has his new call . . . W2VND. He celebrated using his new call by being the first contact for *TA3SO*. He also had a little unusual incident by working six stations in a row, the call letter of which are *ON4WK*, *OK1LM*, *OZ5ZW*, *OA4R*, *OX3BF*, and *OH2PR*. So he didn't work an OQ? Oh!!

Now I am going to get on the soap box for a minute. By the time you wade through this column, our book "CQ DX" will be available, but you can't get it for nothing. You have to have at least half a dollar. This book contains a lot of stuff which should be of interest to any DX man. Then, whether you know it or not, the large size zone maps, printed in four colors, are available. Some of you have been inquiring about this from me. You're going to have to pay for this too . . . a whole buck. However, we do have something for free, and that is a copy of the Country List printed on one side of a sheet of paper, so that it may be tacked on the wall, or put under the glass top of your desk for easy reference. Just send a large size, stamped, self-addressed envelope to the magazine, and a copy will be sent to you by return mail. As a matter of fact, we will send you two

copies, if you wish. Now I'll get down off the soap box, and to work.

A second installment from W2PEO indicated he is still after them and now has 38Z and 120C. His new zone is *UAØKQA* in 19, while the countries include *VU7JU, ZD1KR, UH8AF, TA3SO, ET3Y, UR2KAA*, and *UJ8AD*. W9WEN is up to 29Z and 61C. Some of his new ones are *KG6AJ, J3AAD*, and just to make sure, he also worked *J2AIA*. W9WEN got a bang out of working the two "Js", as in 11½ years on the air, he had only one other J. W6ENV still finds time to work them, and is up to 39Z and 139C . . . his all time total is 157C.

W2BXA just won't give up working new ones. He actually has worked 40Z and 160C, lacking only a card from Zone 19 for all confirmations. As you know, in the Honor Roll, no one will be shown with 40 zones until all confirmations have been received. Ben has an all time total of 173C . . . his phone to phone total is 36Z and 100C.

W9NRB is up to 39Z and 127C. Smitty says he doesn't know why some fellows gripe about not receiving QSL cards, because he has received 102, which is a pretty good percentage. A couple of his latest are *ZD3B* and *LI2JC*. W3JTC now has 33Z and 91C. Larry is wondering whether *VP8AD* is in the Falkland Islands or South Georgia. Since it may be of interest to others, he is in the South Georgia group. *KP6AB* and *KP6AA* are in the Palmyra group. W3JTC says he thought there was only one island; there are actually 2 or 3 islands in the group, although it is very doutbful that the other islands will ever see a Ham station.

[*Please QSY to page 52*]

W.A.Z. HONOR ROLL

	POST WAR C.W.—PHONE		ALL TIME	
W2GWE	39	165		
W2BXA	39	160	39	173
W6VFR	39	155		
W8BKP	39	149		
W6ITA	39	147	39	155
W8HYC	39	145	39	154
W6ENV	39	139	39	157
W6ADP	39	131	39	162
W9NRB	39	127	39	136
W6SA	39	127		
W6SN	39	124	39	147
W6SAI	39	121		
WØGKS	39	109	39	136
W2PEO	38	120		
WØYXO	38	112	38	124
W6WKU	38	112		
W2IOP	38	109		
W6LER	38	96	38	114
W6LEV	38	79		
W3JNN	37	133		
W4BRB	37	120		
W3FJN	37	116	37	128
GEDO	37	115	37	132
W3EVW	37	111	39	146
W4OM	37	105		
W8CVU	37	104		
W3IYE	37	104		
W6TI	37	97		
W6ANN	37	95		
W9RBI	36	103		
W4FPK	36	101		
W6VBY	36	95		
W9YNB	36	88	36	91
OK1AW	36	87		
W5ASG	35	122	37	145
W8NBK	35	111		
PY1DH	35	104		
W6AM	35	87	36	104
VK2ACX	35	85		
W1BIH	35	100	35	106
W9VND	34	85		
W7FNK	34	54	36	64
W3JTC	33	91		
W4DIA	33	77		
W3KDP	33	75		
W6UZX	33	69		
CM2SW	32	100	34	107

	POST WAR C.W.	PHONE	ALL TIME	
W6QD	32	76	39	149
WØAZT	31	75		
W2JA	31	63		
W2TJF	30	74		
WØLAW	30	67		
W9WEN	29	61	29	70
W4GVP	29	60		
KP4KD	28	75	31	106
W2PUD	28	68		
W6JFJ	28	53		
W6LRU	27	57		
W6PBV	27	56	28	61
W5EWZ	27	45	30	57
W6YYW	25	53		
W9ACU	25	48	26	51
W9KMN	25	45		
W8PCS	25	41	26	51
W1LQQ	24	51		
W6ZZ	23	44		
W8QUS	22	43		
W2GVZ	20	45	39	126
W6UWL	13	19		
	PHONE			
W1HKK	37	109	38	121
W6DI	36	110	37	129
W8BKP	36	106		
W1JCX	36	105		
W2BXA	36	100		
G3DO	36	97	36	113
W3DHM	36	96		
W4CYU	35	115	36	131
W1MCW	35	105		
W9HB	35	89		
W1NWO	35	85		
W1FJN	35	84		
W6SA	34	69		
W2DYR	33	82		
GM2UU	33	77	36	104
W9RBI	32	80		
W5ASG	32	77	32	95
W8BIQ	32	75		
W6PXH	31	74		
W5LWV	31	70		
W2NXZ	31	59		
W2NSD	29	72		
W9FNR	29	65		
W6ITA	26	65		
W4GVP	25	48		

V.H.F.-U.H.F.

by Vince Dawson, Jr., WØZJB

[Send all contributions to Vince Dawson Jr., Box 837, Gashland, Mo.]

THE V-H-F GANG all over the country are now getting the thrill of working DX on both 50 mc and 144 mc. Summer brings the Es skip on 50 mc from 500-1500 miles, and on 144 mc the DX is worked by bending or ducting, which is brought about by temperature changes. Those of you who want a rest from QRN on the lower frequency bands during the summer, might well take advantage of these conditions by joining the gang on any of the very high frequencies.

We always welcome reports, no matter how large or small. But to be sure they get in this column as soon as possible please get them to us by the *20th* of each month. Reports for 144 mc are pitifully lacking; come on gang make with the news.

Miscellany

Harold Klaiss, W4QN, of Orlando, Fla., now has joined the immortals, by working OA4AE, in Lima, Peru, on April 19th at 1510 EST. Signals were R-5 S-7 at both ends. Harold was running 65 watts to a new 3-element beam and OA4AE was using his same 45 watts to an 807. The contact wasn't very long as OA4AE was looking for XE1KE in Mexico City, who has been hitting the 50-mc band very hard here of late. This contact was evidently a dying gasp of the F2 layer before giving into the summer's session of Es skip.

Another DX contact of interest is one between W5JLY, San Antonio, Texas, and W5BSY/MM aboard the SS CREST OF THE WAVES, who was 150 miles East of the Bahama Islands on May 16th at 1818 CST. W5JLY had just signed with W4AQ in Florida and called a CQ when he was given a nice surprise by W5BSY/MM calling him. This contact appears to be via Es skip in the neighborhood of 1400 miles. W5JLY was running 60 watts to a pair of 807s, a 4-element beam wide spaced 25′ high, with a VHF-152 converter. W5BSY/MM was running 40 watts to an 807, W5JLY being so excited he forgot the rest of his lineup. The contact was good enough for W5JLY to take a message to W5BSY/MM's folks in Denton, Texas.

On May 11th in the morning, during an Es opening to the east, WØTQK, Parkville, Mo., did some nice close-in work by getting W9PK (400 mi), WØJVE in St. Louis at 245 miles and W9LMX in Indiana at 425 miles. This is more like 5 meters, although at the same time W2-3-4s were rolling in.

Just in time for the column comes more news of contacts with our "new DX station on 50 mc," W5BSY/MM near the Bahamas.

Around 1900 EST, W8NSS, Earl Lightcap, in Dayton, Ohio, was surprised to have his CQ answered by W5BSY/MM. Earl had just gotten on 6 meters and thinks it's an fb band, what with a nice contact like that, and new on the band.

A contact with W4WMI in Raleigh, N. C., on 50 mc gave us the news that the Raleigh gang worked W5BSY/MM on May 17th, at 1930 EST. By the gang we mean W4WMI and W4HVV.

From all the dope the gang gave us we understand that W5BSY/MM is on his way to Italy and with these W contacts under his belt he is monitoring the band daily. This expedition should bring out some nice facts about Es on 50 mc.

North Carolina V-H-F Contest

The Raleigh Amateur Radio Club is sponsoring a v-h-f contest to encourage old and new amateurs to build and use v-h-f gear. Any licensed amateur in N.C. who has never contacted another station in excess of 5 miles, on any v-h-f band, is eligible to compete. A station may be worked on more than one v-h-f band with a multiplier of 2 on any band above 144 mc. Those entering the contest must notify W4HVV at 2010 Reaves Drive, Raleigh, N.C., of the date, time, band and station contacted. The contest period is from April 1, to December 31, 1947. Prizes will be awarded to the 1st and 2nd place winners. Further information may be obtained by contacting W4HVV.

International Notes

VE7AEZ in Vancouver, B. C., reported to W7DMN that he heard VK2NO on 50.1 mc using c.w. with very weak and fading signals. This reception took place May 8th, at 2220 PST. He is now awaiting confirmation, and will no doubt let us know additional details.

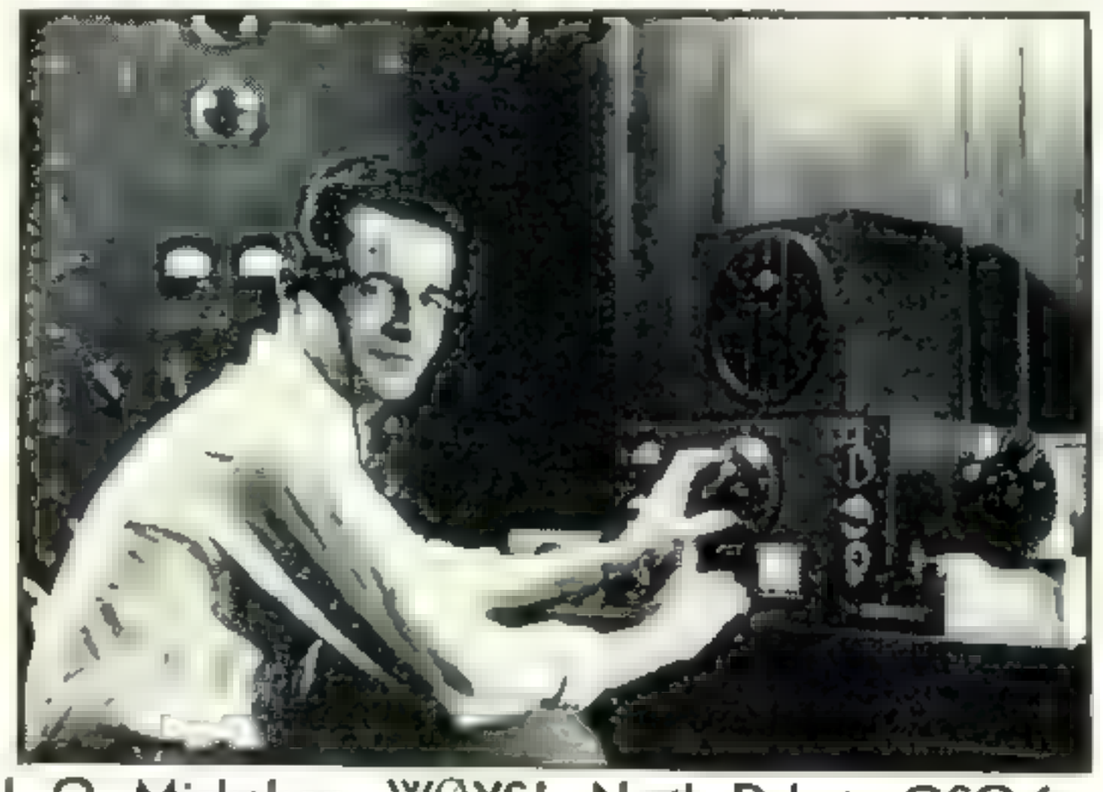
W4HVV says that HP1A on 29.4 mc has an SX-36 and will be glad to make test skeds with anyone.

VE2KH, in Montreal now has a dual-composite beam for 10-6 meters. John says the beam on 6 really works, as his signal is S-9 plus on the other side of their 700′ mountain, at VE2GT in Valois. VE2GT used to be just about the weakest sig heard, but the beam has helped bring him up to S-9 on receiving. John has yet to hear any 50-mc skip stations but is still in there hoping.

Via W7QAP we learn that CE3FV is now QRT, as he has been transferred to Lima, Peru. (Now ain't that a coincidence, with the good luck OA4AE in Lima has had with the W4s). Well after a while in Lima, CE3FV has now left for Santiago to live and from there will be on for next Fall's F2 activity on 50 mc.

From *Short Wave Magazine* we find that via aurora on April 17th, GM3BDA heard G5MA, a distance of 352 miles, for a new G DX reception record.

Up in VE4 land, VE4YW and VE4AP-VE4NB are holding down 50 mc and waiting for something to happen. VE4YW runs 46 watts xtal controlled to an 807 on 50.189 mc, and has a fixed 4-element



J. O. Mickelson, WØYSJ, North Dakota QSO for many a v-h-f DXer on 50 mc.

beam headed north, as aurora lights are observed each evening. VE4NB is in process of building an 807 xtal rig, while VE4AU has a mobile transreceiver in his car and provides them with QSOs.

50-mc Openings

The openings so far in May have been of a rather spotty nature. One thing we here in the west have noticed is more openings to the south and far west, than to the east as it was last year. This no doubt is due to the activity of 50-mc stations in areas that were silent last year.

With the way new states have been added it is keeping us hopping to keep the Honor Role up to date. Remember all you have to do is drop us a line giving your score and it will be added.

Starting where we left off last month with the 17th of April here is the 50-mc DX story by dates:

April 17: W7DMN, near Seattle worked W6GGM, JUM, IWS ANN and W6FPV from 2120-2340 PST. At 1310 CST W9ALU in Ill., had aurora and got WØDYG in Nebr., and heard Ill., Ind., Wisc At 2105 Es opened, QSOs with W5HF and MLE followed, all new states for Hod W5EVJ, El Paso, reports band open from 2130-2230 MST when WO, W9, W4, W6 came in, with W5ESZ in on it also. WØDNW, N Platte, Nebr., got W7ERA, W4EQM, W5LCZ and W5FRD W6ANN, had nice Q Os with W7CAM, JPA, BQX, DMN, DYD, ERA, HEA, DF, CTY, VE7AEZ, VY. W7ACD on 28 mc worked cross band, W7HLB in Ore., W6LYQ and W7BQX in Wash., WØYSJ N Dak., got W5FRD for his first Es QsO. At 1830 EST, W8RFW heard on aurora, W9HGE, LMX and W9QUV. Then Es c me in and he got W5DXB and W9LMX (aurora?), hearing W5 F, WX, FRD, ZS, ML, JLY, W5JLY, San Antonio, hook e WØTI, HAQ, IFB, DXM, JHS, QIN, W9LMX, QUV, DWU from 2153-2338 CST. W7DYD in Wash. had very good contacts with the gang in Calif, Utah, and Ariz., from 2130-2345 PST. W6OVK, W6PBV, W6EUL had fun working W7EUI, BWX, VE7BQ, hearing W7FLQ, DMN, and others weakly.

April 18. W7ERA,O re., worked W6WNM, ANN, FPN, A C, QUK, BWG, IX, JUM. W7FFE, W7FDJ, W7ADW, worked the same ones. W6WNM got W7DMN, EVO, ERA, DF, DYD, EUI, VE7VY, AEZ, and heard a marker station from the west, could be KH6 he says. WØBJV, S. Dak., made contacts with W5FRD, LCZ, ML, DXB, ZS, WX, picking up some new states. W6ANN left for Club meeting with things roaring in Calif. W5FRD, with W5LIU as op, worked WØDZM, IFB, BJV, HAQ, JHS, LC, TQK, HRF, DYG, YSJ, ZJB, W9LMX, LG?, HGE, QUV, IOD, QKM, QUV, ZHL, DWU, PK, W8KQC, CYE and W5JDL, a local who had lost faith in 6! W7ACD still on 28 mc, got W7BQX, HLB, a.m., and p.m. heard W5LCZ, FRD, for 2 hours, and W6GGM. W7DMN, Wash., QSO'd 16 W6s from 1745-1935 PST, hearing WØCJS. W9ALU heard W7BQX in Wash. although 28 mc was dead for any skip. W8RFW heard W5FRD, JLY. W7DYD, Wash., QSOd W7ACD in Idaho cross band at 0830 PST; band open again at 1745 for WØCJS, BJV, KQO, IFB, SV, HAQ, DWU, W9ZHB and heard two W6s. W7DMN, EUI, DF, EVO, KO were working W6s also.

April 22: WØJVE, St. Louis got, on aurora, W9JMS, UNS, VZV, DUI.

April 23: WØJHS, Minn., worked W5JLY, VY, LBG, with WØDZM, QIN, working the same fellows. W9ALU in Ill. heard several 50-mc stations burst in and out. W7GBI in Montana, heard W4URT on 51.3 mc at 2140 MST, another sig was unreadable. W5JLY, got WØQIN, JHS, DJM.

April 24: W5JLY got WØDZM, QIN after midnight the 23rd.

April 26: W7QAP in Ariz. heard W6QT at 1717 MST. At 1732 a commercial harmonic KNG/KWM on 51 mc was S-9, another harmonic of a BC station 54 mc was good.

April 30: W6WNM, around 1400-1412 PST, heard a W1 testing on 50025 kc, and heard another W1 in Conn., say he had a 3-element beam on 50100 kc. By 1500 they were gone. At 1545 W7JPA broke through, then W7HEA came in. At 2000 the band opened wide and Poncho had contacts with W7DMN, DF, ERA, FFE, QQD (Utah), all sigs with a bad flutter. W7ERA in Ore. worked W5ELL in N. Mexico at 1830 PST, W7QAP, TXM, W6PUZ, WNN, QG, MYC, APG, BOS, FPV, SFY, IX, NAW, TMI. W7FDJ and FFE worked the same stations. W6FPV worked W7QQD, SP, JP all in Utah and W7ERA DYD, with fair sigs. In Tuscon, W7QAP got W7DMN, ERA, HEA, FFE, FDJ, hearing W7FLQ from 2007-2050 MST.

May 1: This date brought the first 1947 *WACA* to WØYUQ at 2038 when W6ANN was contacted and for WØZJB 3 mins later. WØTQK also worked W6ANN and heard several others but with weak signals. 28 mc was dead for skip, although the W6s were hearing SS to Colo. and W. Kans. These contacts were on the edge of the skip at 1450 miles, the last 200 miles no doubt via bending, as WØYUQ 115 mi west was S-9.

May 2: W7ERA had a quickie with W7SP in Utah at 0825 MST, no other sigs heard.

May 5: W5JLY added some good ones from the 4th district, from 1817-2050 CST by getting W4KIT (S. C.), FBH, EQM, HVD, GJO, QN, NK and W7SP (Utah). W8NSS in Dayton got W5EXO at 1925 EST for a nice contact. W5VV finally caught an opening and hooked W4EQR, GJO and W7SP. The Eager Beavers, WØYUQ, DKS, TQK, ZJB, all had nice QSOs with W7QAP, TXM and a cross-band with W7KAE on 28 mc. W7KAE used to chase DX on 6 with us last year, remember him fellows??? W5ESZ and W5EVJ in El Paso also worked all the Beavers, with W5ESZ adding W5FSC. W7QAP got WØTQK, DKS, YUQ, ZJB, VWU and heard W5FSC from 1856-2030 MST.

May 8: W1ATP in Mass. says that W4GJO brought the band to life at 1930 EST. Grid's sig was strong and steady for over an hour.

May 9: W7ERA had QSOs with WØUSI and WØBJV from 1920-1942 PST. Walt also heard a couple of other stations using break-in and not knowing the band was open.

May 10: WØYKX in Ia., resting from Mayo's made this opening, getting W3FQZ and a local WØDYG in Nebr., all this from 1414-1430 CST. W5JLY QSOd with W9ZHL, JMS FFN, all in Indiana, from 1624-1642 CST. W8NSS got W5HTZ (Okla.), WØDKS, ICV, W5AJG, LIU, from 0930-1115 EST. WØYSJ in Fargo, N. D. gladdened the hearts of W5JLY, AJG, HF, WX, W9NVY with contacts. WØYKX caught this

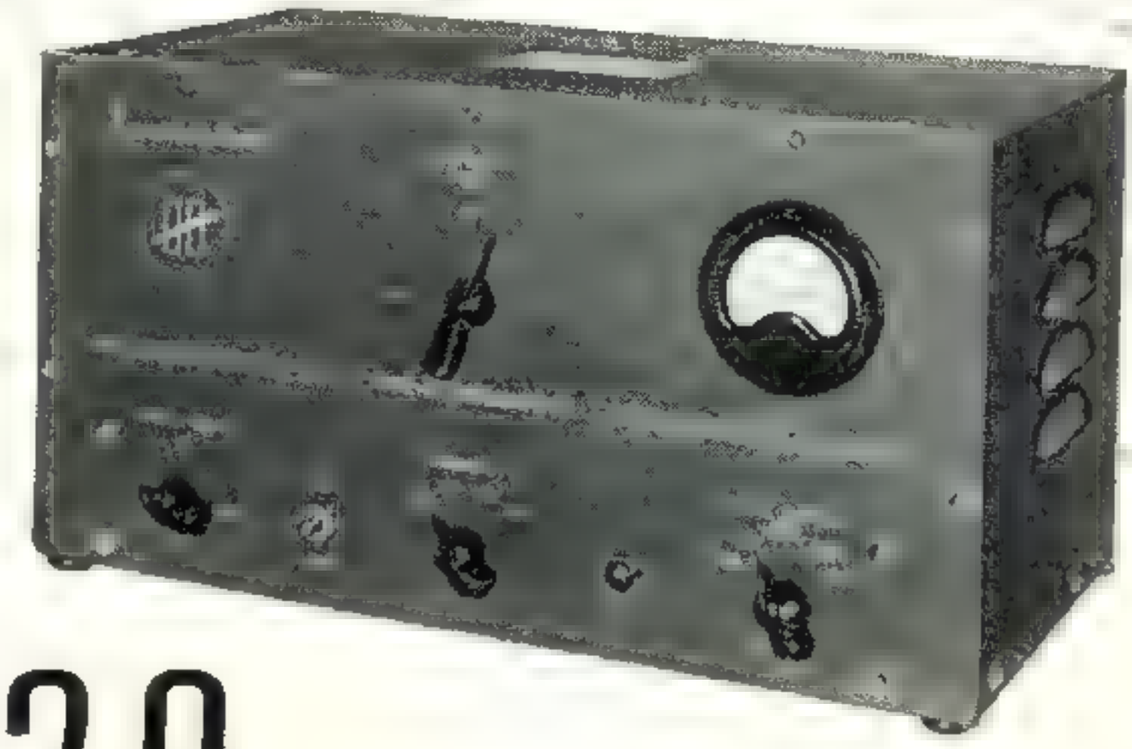
50-MC DX HONOR ROLL

Calls	States	Districts	Other
W9ZHB	32	10	VE3
WØYUQ	31	10	VE3
W1LLL	31	10	
WØTQK	29	10	VE3
WØZJB	29	10	VE3-4
W1HDQ	28	10	G5-6*
W9PK	27	9	
WØDZM	25	10	VE3
W1PFJ	25	9	
WØBJV	25	10	
W2AMJ	24	9	
W8QYD	24	9	
W4GJO	21	9	VE3-OA4
W9DWU	21	9	
WØJHS	20	9	
W2RLV	20	8	
WØSV	19	9	
WØJVE	17	9	
WØQIN	17	8	
W2IDZ	17	7	
W5HF	17	7	
W5JLY	17	7	VP7
WØYKX	17	6	
W3RUE	16	9	
W4HVV	16	9	VP7
W8SLU	14	10	
W5FRD	14	9	
WØJCQ	13	10	
W6NAW	13	8	
W9ALU	13	7	
W5WX	13	6	
W5VV	13	6	
W4WMI	13	5	VP7
W8NKJ	12	8	
W6ANN	12	7	VE7
W7ERA	9	4	
W3KFM	8	5	
WØTIO	8	5	
W6QUK	6	4	VE7
W6YBP	5	5	VE7
W6WNN	5	3	VE7
WØPKD	4	3	
W5LIU	4	3	
W5ESZ	4	3	
W8TOB	4	2	
W7JPA	3	2	
WØYSJ	3	2	
W7BOC	2	2	
W7CTY	1	1	

**Cross-band 50-28 mc.*

YOUR REPORT

RST=5-9-9x



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opening also and added to his score, W9UNS (Ind.), W4FBH, W1KMZ/3, the latter in the after-noon. W5AJG took time out sorting DX QSLs for others and got WØYSJ and W8NSS, hearing W9DWU, all this in the a.m. W5HF in Amarillo, from 0915-1122 CST, went to town with WØHAQ, HXY, URQ, JHS, DZM, QIN, YSJ, QIQ, W9PK, DUW. W7DMN worked three W6 Stations, Nev. (who is the lone voice out there?), and Utah, the latter state going out last at 1415 PST. W5WX caught WØDZM, URQ, JHS, DUW, IFW, AZE, QIQ YSJ and W9RBI (Wisc), between 0915-1130 CST. W8NKJ in Detroit worked W5FSC and WØICV and heard W5HTZ (Okla.). Al also heard severl WØs and 9s for some close-in skip, between 1030-1100 EST. WØJHS in Minn. had a "You all opening," when W5HF, W5MLE (N. Mex.) came in. WØHXY worked W5HF, WX, when his "Magnetic Gismo," showed activity. He also got WØAZE in the southern part of Minn. from 0945-1100 CST. W5LIU in Cowtown, Texas, "dood it," by working his first Es DX, when he hooked W8NSS at 1104 CST. From 1315-1430 MST W7ERA rolled up W6BWG, LSN, AOR, IF, VXJ, SQO, ZIY, LB, HZ, ODW, NYF, GZZ. WØDYG, W. Nebr., was heard to say that he had heard and called a KH6 with fading sigs At 1530, W7ERA heard two W6s in QSO. At 2025 Walt worked W7JPN, EWX both in Utah, and at 2105-2135 he heard W6ANN, NAW, IWS for a big day. W5JLY got WØYSJ at 0942, his only QSO this day. WØWOW, 4 in N.C. heard W5HTZ at 1030 EST. Warren will be on soon. The Beavers in Mo and Kans. all got W9LMX in Ind., W4EQM, W4FBH, W8FF, a.m. and at 1435 W2BQK, JPX, SGV, LBK, DLO, W1EYM, W8SFG. During the morning opening WØTQK worked WØJVE in St. Louis, a hop of 250 miles. W7QAP heard W6HZ, A-1 with bad QSB at 1125 MST.

May 12: W5JLY worked WØJVE and W9QUV from 1901-1930 CST for only report of the day.

May 14: WØTIO, Slater, Ia. had a nice opening, getting W7JPN. A Denver station was hooked but did not get his call, a second Denver station was heard as well as W6PUZ and two W5s in Texas. All this from 2030-2105 CST. WØYSJ got W5AJG, WØICV, HAQ, YUQ. W7QAP had a weak day-contact with W6IWS at 1125 MST, both having the band to themselves while us working people were slaving away. Sigs were S-9. W6CCJ, an A-3 sig on 50.3 mc and numerous diathermy sigs were also heard. WØYKX started at 1420 to 2040 and raised W5VY, W2QVH, BYM, W5ML, W4HVD, W5LCZ (Ark.), W4EQM, EQR, W5ZS, in order, for nice contacts W8NSS, from 1915-2130 EST got WØYUQ, TQK, BPY, W5HF and W6HZ, the latter the first double-hop contact reported to us. W5JLY got wound up with WØUSI, HAQ, QIN, SV, QIQ, DWU, W9GGH, QKM, ALU, ZHB, VZP, W8RFW, QQS from 1721-2020 CST. W6YBP got in on some of the double hop by working W8QYD at 1623. From 1047-1557 PST he worked VE7AEZ, W7DYD, W9JMS. At 1305 he heard a station on the low end with a Spanish accent. Harold says he could have worked a dozen more if c.w. had been used, this included W2s and WØs. W5HF really got 'em by hooking WØQIN, URQ, JHS, MVE, SV, MZJ, W9JMS, UNS, QKM, QUV, ZHB, GGH, VZM, W8RFW, BTL, W3OMY. His power was off for 80 minutes, due to a storm. W9ALU worked W5JLY and heard W6PUZ, W7SP, W4EQR, W5ZS, WØVIK (Colo.) and several dozen of the 50 mc "regulars." W5WX had the same power failure as W5HF but managed to work WØQIN, SV, JHS, BJV, USI, DZM, URQ, MZJ, W9GGH, QUV, ZHB, HGE, W8RFW, JLQ, VIB and heard stations in N.C., S.C., Tenn., Ky. and Ala., all new states for Bert. W8RFW worked W5JLY, WX, AJG, ZS, HF, LIU, VV, hearing W5GVO, ML, WØVIK in Denver who was S-9 plus. WEAJG let the QSLs sort

V.H.F.—U.H.F. RECORDS

Call	Distance Miles	Date
50 MC		
J9AAK-KH6DD, W7ACS/KH6	4700	1/25/47
144 MC		
W3HWN-W1MNF	410	11/19/46
235 MC		
W6OVK-W9OAW/6	186	
420 MC		
W6FZA/6-W6UID/6	170	9/28/46

No other record reports received for other bands.

Dual 6 and 10-meter array at VE2KH, Montreal, Quebec, Canada.

themselves and took time off to hook WØCJS, SV, JHS, DZM, USI, QIN, YSJ, QHC, URQ, KQO, DB, W9VZP, DWU, ZHB, QUV, W8RFW, QQS and heard W2BYM, W8JLQ, AKR, VIB, W9BZP, HGE, WØYKX, HXY, QIQ, BJV, IFB, KYF. Sounds like the ole days, Leroy. WØJHS opened up with these; W5BLG, HF, WX, BUV, ML, AJG, VV, FSC, W4HVD and heard more. With 12 watts WØQHC got W5AJG, ZS. W9UNS had an fb session getting W6AOP and W6HZ on double hop, then W5MLE and WØVIK for two new states. W5ESZ added WØDZM and W9HGE to his list.

May 15: W9DWU in Minn. got WØUSI (S. Dak.), WØCJS (S. Dak.) on aurora, from 2000-2130 CST.

May 16: This is the date W5BSY started giving the 6-meter boys high blood pressure while he was Mobile Marine 150 miles east of the Bahamas. Other scores of the gang are also interesting. W8NSS got W5BSY/MM, W4IUJ, FLH from 2135-2150. W8RFW reports this date as the best yet for sigs across Lake Michigan when he worked W9GGH in Kenosha, Wisc., S-9, at 115 miles. W5LIU says the splatter and QRM were fierce but he worked W9QUV, W8QYD, RFW, VIB and heard hundreds including, W9LMX, QKM, ZHB, UNS, WØKQO, USI, YKX, SV, TQK, 'twas like 20 phone says he! W9ALU got W5JLY at 1453, heard W5VY (W5EHM), BUV, LOW, til 2100. W5WX QSOd, W4EQM, EQR, FBH, and one in his same state W5FSC in Houston, all from 1953-2047 CST. The Beavers in Mo. and Kans. worked W5JLY, LOW for several hours. W5JLY started off at 1455 CST by working W9ALU, FHR, PK, HGE, DRN, GGH, FKI, QUV, WØYKX, ZJB, TTL, W4AQ (Fla.), GJO, QN, EQR, 'til 2145. Of course Earl got W5BSY/MM at 1818.

May 18: WØYSJ worked W7HEA, FDJ, FFE the only opening reported.

May 20: W5WX had a good one to W6 as he got W6IWS, NAW, UXN, WNN, FMH, FPV, AMD, QFT, TMI, while WWV was sending Ns. The Beavers enjoyed working W4HVV, W4WMI, QN, FLH, DRZ, the first time Miami stations have come in the mudwest (1250 mi) since 5 meters.

May 21: WØTQK worked 8 W1s from 1420-1700, the band opened again spotty for W2-3-4 throughout the evening with 28-mc red hot.

50-mc Gang

Where there's radio there are always Hams, so what should be better than the Chicago Parts Show May 11-17. Your compiler of this column was there, and managed to spot W2AMJ, W8KQC, W9PK, WØIIC, W5HHT and others on the PL (phonograph listeners) bands. A little get-together was had and enjoyed by all . . . Frank, W2AMJ says he has a hot 6-meter converter coming out that is a honey. Of course meeting these lads made the trip a success, but when we stepped into the shack a little note on the mike advised us that WØTQK had gotten La. and Colo., while WØYUQ had gotten N. Dak. and Ark. Woe is us!!

W5JLY in San Antonio has been doing some work on bending that has the Texas lads pepped up. He has worked W5FXC, Houston at 190 mi.; W5VV, Austin at 85 mi.; also Pat W5VY/5EHM, who has his mobile rig at Austin; W5LOW, Corpus Christi at 150 miles. All this using 60 watts to a beam 25 feet high. Now he sez how about the Big D and Cowton boys?

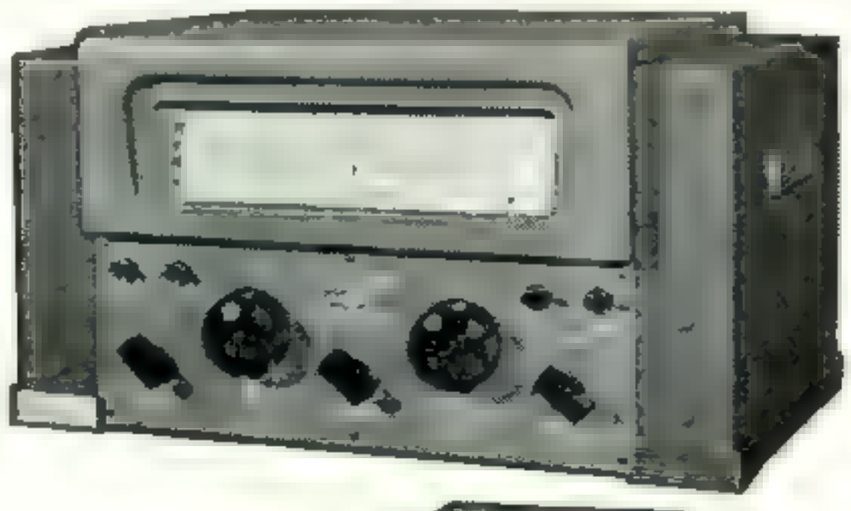
W8NSS, Dayton, is new on the band and has 150 watts to a pair of HK-54s feeding a 7-element beam.

The boys in Wash. and Ore. are now making the grade over the mountains, which are rugged out

HRO-5A1

This famous receiver has recently had a number of refinements added to it, including a highly efficient noise limiter and a redesigned flexible crystal filter. Frequency range is normally from 1.7 to 30.0 mc. Additional Coil Sets can also be obtained to cover the bands from 50 to 2050 KC (except for 430 to 480 KC).

Amateur Net $274.35
(with tubes and A,B,C,D Coils)



NC-46

In the more inexpensive class, the NC-46 is one of the best buys on the market. This is a 105 to 130 Volt AC-DC receiver, providing 3 watts of audio output. The frequency range extends from 540 to 30,000 KC covering four bands.

Amateur Net $97.50
Matching Speaker 9.90

CRU Oscilloscope

The CRU is a compact, inexpensive 2" scope especially designed for transmitter modulation checking. Circuit incorporates a self contained power supply, controls for brilliancy and focus, a potentiometer for controlling the amplitude of the horizontal deflection, as well as a built in 60 cycle sweep.

Amateur Net (Table Model) $39.90
Amateur Net (Rack Model) 42.75

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● There's nothing that will turn a buddy who's a BCL or an SWL into a real ham so quickly as watching you operate a really good receiver which picks up sigs from all over the world.

You know the thrill that comes from working DX for the first time and if you can get that friend or that YL to spend an evening with you watching a good OP and a good rig at work, you'll soon have a new ticket-holder on a favorite band to chew the rag with.

National equipment will not only increase your traffic, but will make you proud to show off your station to friends.

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MAKERS OF LIFETIME RADIO EQUIPMENT

there. W7ERA near Portland, Ore., worked W7DMN near Seattle and W7DF, NE Seattle, a distance of 187 mi. Walt also got W7EUI in Kirkland, then swung his beam to work W7HEA in Toppenish and W7BOC, about 140 miles. VE7AEZ in Vancouver has heard W7ERA at 270 mi.

W1ATP in Holliston, Mass., says lots of new W1s are getting on, including W1AUY in N.H. and the Manchester Radio Club on 50.8 mc. They have roundtables each Tuesday at 2000 EST, and urge others to join them.

W4HVV and W4WMI in Raleigh, N.C., have been making the 175 mi. jump to W4FJ in Richmond, Va., and to W1KMZ/3 in Wash., D.C., 240 mi. They are now gunning for W4KMK in Greenville, S.C., at 200 mi.

W5VV wants the North Texas gang to join them in their contacts on bending. Wilmer mentions that the nightly skeds with W5FSC at Houston are holding up 100%.

WØJVE in St. Louis says that WØGHW is now back on with a pair of 812s. Kin is hot on the band this year and is rolling up a good score.

W7QAP in Tuscon says that the EL Paso gang want skeds with Arizona, as does WØSGK/7 in Boulder City, Nev. This sounds interesting fellers, leave us know what happens about it.

W7ACD, in Shelley, Idaho, says that his 487′ Vee beam works better than the 4-element rotary on receiving. WØYSJ, the lone N. Dak. contact, hopes to have his 4-element beam on a 32′ tower, to replace his folded dipole.

WØDNW, N. Platte, Nebr., is working on WØBPY in Grand Island to get on to keep him company. The distance is about 135 mi. so should be a good hop this summer. WØDNW has a coaxial line converter, with 4″ OD silver plated pipes, 20″ long, loaded with capacity to hit 50 mc. He has found that oscillator injection seems to be very critical, and so far has found grid injection to work better, with suppressor injection very poor.

Chip Korman, W3KFM, of Baltimore is spending his first 6-meter season with us. He has a pair of T-55s with 200 watts into a 3-element rotary and a 3-tube converter.

WØINI, Pleasant Hill, Mo., 25 mi. south of Kansas City now is on 50024 kc with 400 watts to 8005s and a 3-element rotary with a VHF-152 for

[*Continued on page 62*]

Postscripts

W2CPX, Centennial Philatelic Exhibition

Amateur radio station W2CPX—the call signifying Centennial Philatelic Exhibition and specially licensed by the F.C.C.—was operated May 17-25 at Grand Central Palace, New York City. W2CPX was conceived for a dual purpose—to handle traffic for visitors attending the stamp show, and to effectuate the union between amateurs and the United Nations (see "Zero Bias," *CQ*, June, 1947).

The station was dedicated on the evening of May 20. Participating were Brig. Gen. Frank E. Stoner; Admiral Joseph P. Redman; Benjamin A. Cohen, assistant secretary general of U. N.; George Bailey, W2KH, president I.A.R.U.; and Stanley Lewer, G6LJ, president R.S.G.B. An interview by Bill Leonard, W2SKE, was recorded and broadcast the following morning over WCBS. A general QST was broadcast on 20 meters by the above officials and by John Clarricoats, G6CL, secretary R.S.G.B.

Throughout the remainder of the show W2CPX made twice daily broadcasts of U. N. news, and during the eight days it cleared over 1300 messages. The station, set up with a Temco rig lent by W2KR and Hammarlund receivers provided by W2OXD, was operated jointly by YLs and OMs, with special credit due W2LFR, W2LR, W2PL, W2NJF and W2JZX.

Yonkers Radio Club

Yonkers, N. Y., Hams who took part in Operations Tercentennial in December, sending peace messages throughout the world, have formed the Yonkers Amateur Radio Club. Col. Oliver J. Troster, Tercentennial Commission chairman who was elected honorary president of the club, at the dinner when the organization was formed, read letters from Major Edwin H. Armstrong, former Yonkers resident and inventor of FM, and from Commander C. R. Runyon, Jr., of Yonkers, holder of one of the first Ham licenses issued.

In his letter Major Armstrong praised the Hams for establishing the thousand contacts between Yonkers and the rest of the world and observed "who of us struggling with the spark coils of 40 years ago trying to reach Mount Vernon and Ridgewood ever had the vision to dream that our successors would work in a realm of world-wide communication and would turn it into a powerful instrument of international good will?"

■

QSLs

Did you ever stop to wonder how many QSL cards the typical district QSL manager handles in a month or a year? W2SN, Henry W. Yahnel, recently dropped us a note apologizing for delaying in answer to an inquiry, but he went on to explain that in the six previous days 5,500 cards were received from the ARRL and 25 other foreign agencies. Since 1932 W2SN has handled 226,064 QSL cards. The number has grown steadily, reaching 38,530 in 1938 the last full DX year. Indications are that this will be only a drop in the bucket compared to 1947. No wonder the poor QSL Manager hasn't too much time to work his rig!

●

W1OAS is F. M. Burkley, lives on 97 Hartley Street in Hamden, Conn. A real ham.

●

W1MD, Hingham, Mass., recently received three reports of RST 589X from W4KFF, Tennessee, W1CEH/2, New York, and W2RAM, New York. Considering that the antenna was lying flat on the ground, during a heavy rain, the reports are above average. Now W1MD wants to know, why bother with masts or sky-hooks? Perhaps to keep people from tripping over the antenna.

●

GIRL, 15, ACTS AS SECRETARY OF RADIO "HAMS"

When the Tropical Radio club composed of local radio amateurs receives its charter early next week the secretary, who will have a lot to say about how things are to be run will be a 15-year-old girl.

She is Ginny Seigmons of 2361 SW 22nd Ter., one of the youngest "hams" in the United States, and rated in the Miami area as one of the best.

Her call letters are WRKMM, which she translates as "WR Kiss Me Madly"—she's 15, you know.—*Miami Daily News.*

Gold-plated, not "transplated".(Honest, W4KMM, we're only kidding).

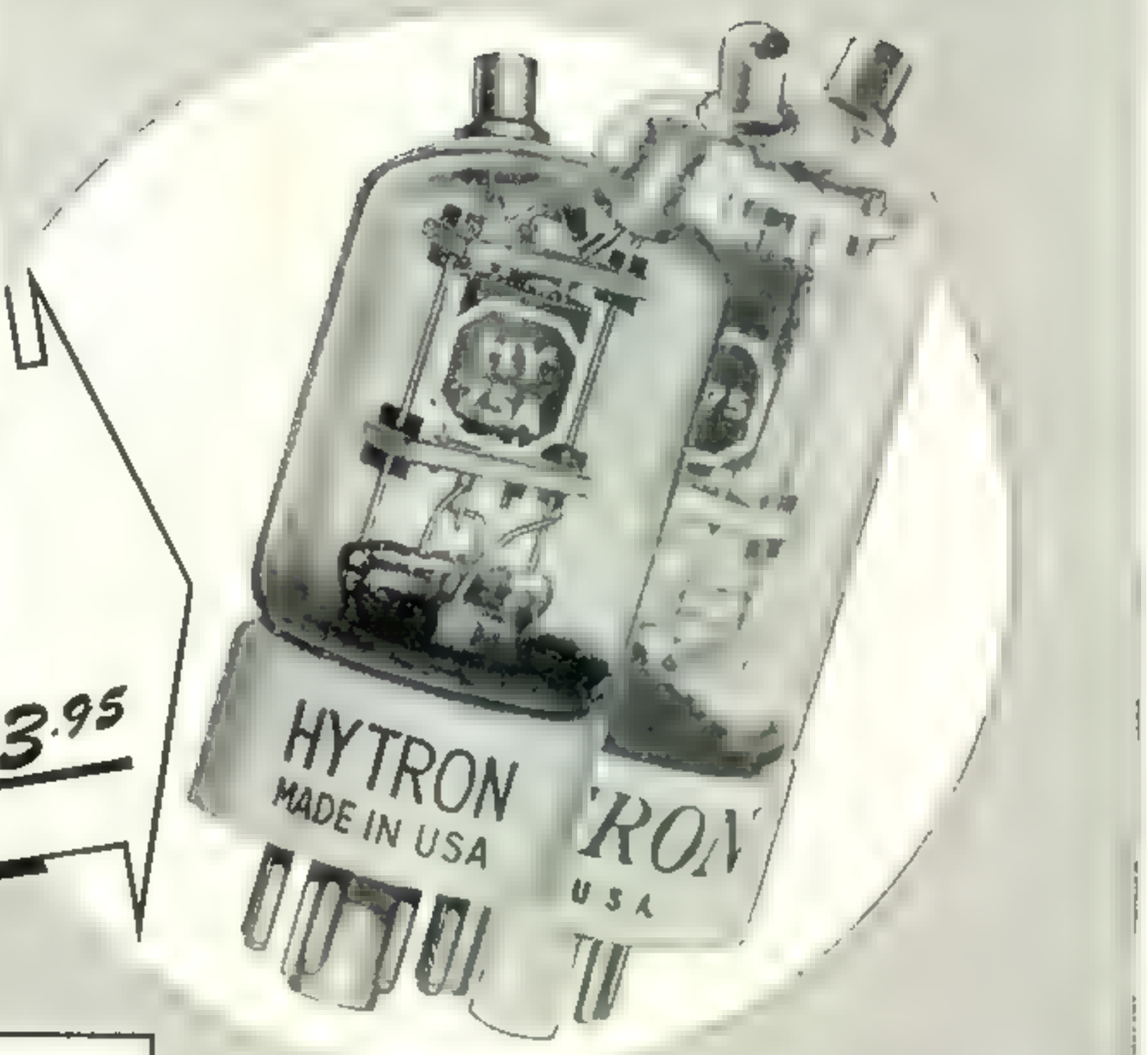
NEW IMPROVED HY75A

25% MORE POWER OUTPUT

INCREASED FREQUENCY RANGE

	Max Ratings
2-meter band.....	100%
1¼-meter band.....	85%
¾-meter band.....	60%

SAME LOW PRICE $3.95



COMPARISON HY75A AND HY75
VHF POWER OSCILLATOR/AMPLIFIERS

GENERAL CHARACTERISTICS

	HY75	HY75A	
Type of filament.....	Thor.	Thor.	
Filament potential.....	6.3	6.3	v
Filament current.....	2.6	2.6	amp
Amplification factor.....	8	9.6	
Transconductance.....	1700	2400	μmhos
Grid-to-plate capacitance.....	3.8	2.6	μμf
Grid-to-filament capacitance....	1.8	1.8	μμf
Plate-to-filament capacitance...	1.	1.	μμf
Max overall length.....	3⅞	3½	in
Max diameter.....	1 7/16	1 7/16	in
Bulb.....	T-11	T-11	
Base.....	Octal	Octal	
ABSOLUTE MAXIMUM CCS RATINGS			
D-c plate potential.....	450	450	v
D-c plate current.....	80	90	ma
D-c plate input	36	40.5	w
D-c grid potential.....	−150	−150	v
D-c grid current.....	25	25	ma
Plate dissipation.....	15	15	w
USEFUL POWER OUTPUT (CCS)—TYPICAL OPERATION*			
Class C unmod.—144 mc#.....	13	17	w
Class C mod.—144 mc#.....	11	14	w

CCS = continuous commercial service. *Useful power output to the load is determined by subtracting grid, circuit, and direct radiation losses from total plate power output. #Actual values using tubes in Hytron HY-Q 75 transmitter are shown.

To improve upon the HY75 was not easy. But the new HY75A does the trick. Useful power output as a class C oscillator is up 25%. Maximum plate current is increased to 90 ma. Grid-to-plate capacitance is sharply reduced to 2.6 μμf. Lead inductance is minimized. Proof of the pudding: an HY75A substituted for an HY75 in a 144-mc quarter-wave line oscillator raises the resonant frequency by 20–30 mc.

How was this accomplished? By a shorter mount, smaller elements, special high-voltage processing of the lava insulators, redesigned vertical bar grid, and zirconium-coated graphite anode. All at no extra cost to you.

When replacing the HY75, the HY75A requires only readjustment of the tank circuit and a higher value of grid resistor. For example, the HY75A can be used in the Hytron HY-Q 75 transmitter merely by retuning the shorting bar and installing a 7000-ohm grid resistor. For replacement or new vhf equipment, the rugged, instant-heating HY75A is your logical choice.

SPECIALISTS IN RADIO RECEIVING TUBES SINCE 1921

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RADIO AND ELECTRONICS CORP.

MAIN OFFICE: SALEM, MASSACHUSETTS

The YL's Frequency

by Amelia Black, W1NVP - W2OLB

A NEW PHASE OF "the war between women and hams" has just come to our attention with a letter from a New York transmitter engineer.

He writes "Maybe you can help a desperate husband urge his XYL to study for her ham ticket. The XYL is interested in amateur radio, that I'm certain of, but her lack of ambition in studying is appalling. I hope to get my ticket in the near future, and I was hoping the XYL and I could take the exam together. Is there anything you can do to help me?"

This brings to mind a multitude of angles. First, is there any other hobby in which a neophyte forces his interest so solidly down his wife's throat? If she really has no interest, must he insist she develop one; if she cannot, must he feel so resentful? Ham radio is not like chess where you must have someone across the board in order to enjoy your game.

If she were genuinely interested, friend engineer, we'd say "Fine! Congrats on your helpful spirit." But if not, then say we, to the dozens of you who've written letters like this, "this is a free land even for hams' wives."

A radio family of our acquaintance are the Dingers of Washington, D.C. They've been married for 16 years and seem happy, though Edith's not a ham. We asked her how well this system worked out, and Edith assured us she's very glad that Harold, W8KG/3, is a ham, for she loves hamfests and conventions and has met many of her best friends through radio.

When the Dingers were living in Ohio, Edith and some other XYLs started a ladies' auxiliary to the Buckeye Radio Club. They planned picincs for the men, and were always a necessary part of every field day. Like many wives, Edith enjoys talking over the air, and will grab the mike whenever she hears another XYL in the background

To some YLs ham radio is the hobby they've always been looking for, and they're delighted to learn "how to become." One such is Holly Long, W4LSB, of Spencer, N. C.

"I don't suppose anyone was ever as proud of his ham ticket," writes Holly, "as I am of mine. I worked very hard for it, over a number of years, and each time I was about ready to go for the examination, something unexpected turned up to prevent me from taking the exam. I finally made it, and then somehow pulled through that awful period of waiting (seven weeks) to hear if I had passed. My OM, W4EAM, who has been a ham for 11 years but had not forgotten the anxiety of waiting, was a real consolation to me. Today I had my 100th contact, which makes an average of over two a day (my license came on March 22nd), so you see how much I do enjoy being a ham. Have worked 31 states and had six foreign contacts. The OM and I both prefer c.w. and work 40 and 20 meters mostly."

Holly asks, "How can I become a member of the YL's and XYL's club?" The only national club for YLs that we know of is the Young Ladies' Radio League, which also has local groups in big cities all over the country. Application for membership may be made through Helen Cook, W6MWO, 359 S. Rexford Drive, Beverly Hills, Calif.

This club, however, is for licensed YLs only. Hams' wives or SWLs might well form clubs of their own, both national and local. We're sure there'd be plenty of mutual interest.

Diana Tuck, ZS6GH

W2WOW (what a call!) has been getting publicity in her local newspaper as the first woman radio amateur in Elmira, N. Y. The wife of W8TXB, Albert Keltz, Jo learned radio through an NYA radio school in Elmira and with constant help from the OM, who was apparently more eager than Jo at first for her to keep on studying. Now she says she's enjoying it and is glad Al kept her from giving up.

Right now Jo's active on 10-meter phone and is using the OM's call of W2TXB plus his 250-watt rig. The Keltzs are now building Jo a rig using narrow band FM on 10 meters.

Kitty LePine, W2FKA, is still nursing the OM, who's got a broken back. Kitty's on 10 and 11 meters these days, reports working VKs on 11, and lots of Gs on 10 phone. Having stuck mostly to c.w. in the past, Kitty's making all sorts of "firsts" on phone for herself nowdays.

Lenore, W6NAZ, keeps on calling CQ from Hollywood and getting answers from former New York neighbors. Last reported, one 10-meter call brought in Rose, W2TU, on her FM phone rig for a long QSO. Then Lenore switched to 20 c.w., and her CQ was answered by Helen Morse, W2NFR. She also has been scheduling ex-New Yorker Ellen White, now W6YYM, on 40 meters.

New York YLs really get around. Marion Hart, W2QVM, who has her own airplane, flew into Los Angeles not long ago from Cuba, where she spent the winter. Hope she'll be getting back on 40 soon.

YL of the Month

Diana Tuck's present QTH might be "unknown, but traveling U.S. and Canadian ham shacks." For Diana, you see, is ZS6GH, and is real DX from Johannesburg, South Africa.

These days she's busy visiting hams from New York to Vancouver, from British Columbia to Cali-

[*Continued on page 68*]

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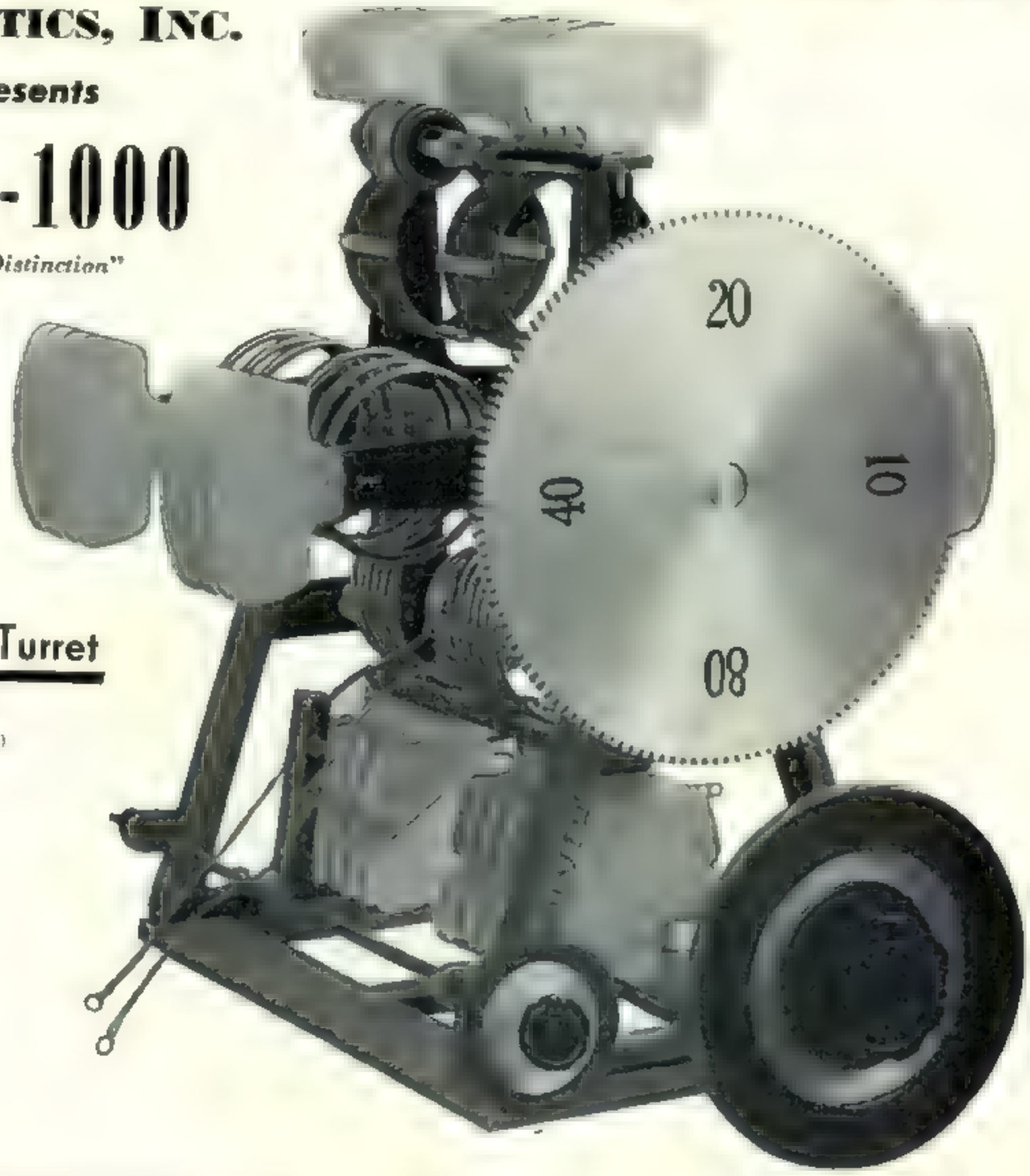

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parts & products

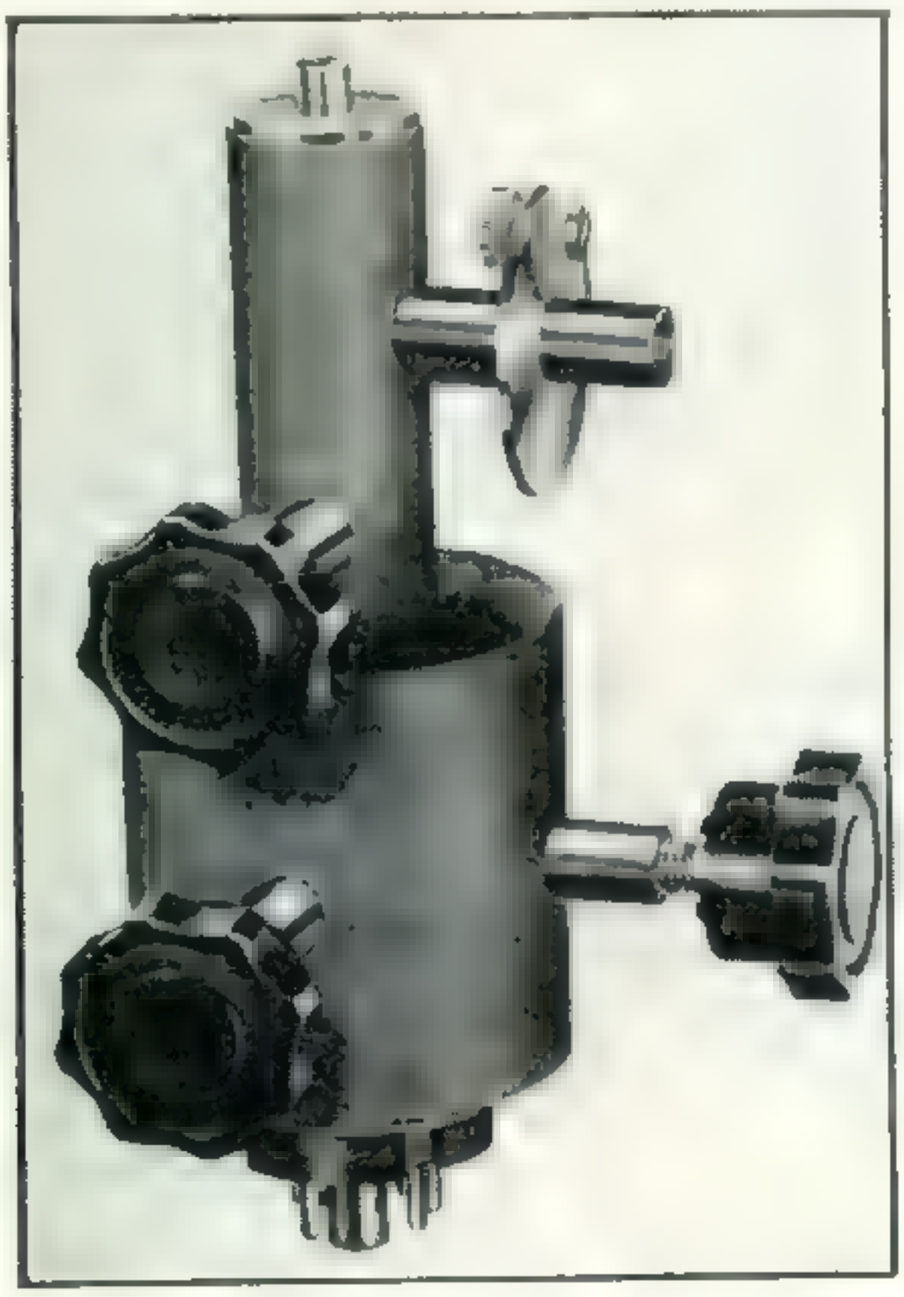
Narrow Band FM Adapter

D & L Electronic Development Co., Hollywood 27, Calif., is manufacturing an adapter for the reception of NBFM. Using a 6AG5 limiter and a 6H6 in a special phase shifting circuit, the adapter is easily attached to all standard communications receivers with an i-f frequency between 425 and 475 kc. The unit may be switched in or out of the circuit as desired.

2400-mc Oscillator

A general purpose oscillator for the amateur 13-cm band, is being manufactured by Decimeter, of Denver, Colorado. Used with the 2C40 disc seal triode, the DM-240-A oscillator operates as a transmitter or receiver, with a tuning range of 2000 to 2500 mc.

As a transmitter, the DM-240-A may be Heising modulated by a 6F6 or 6V6, Class A. As a receiver



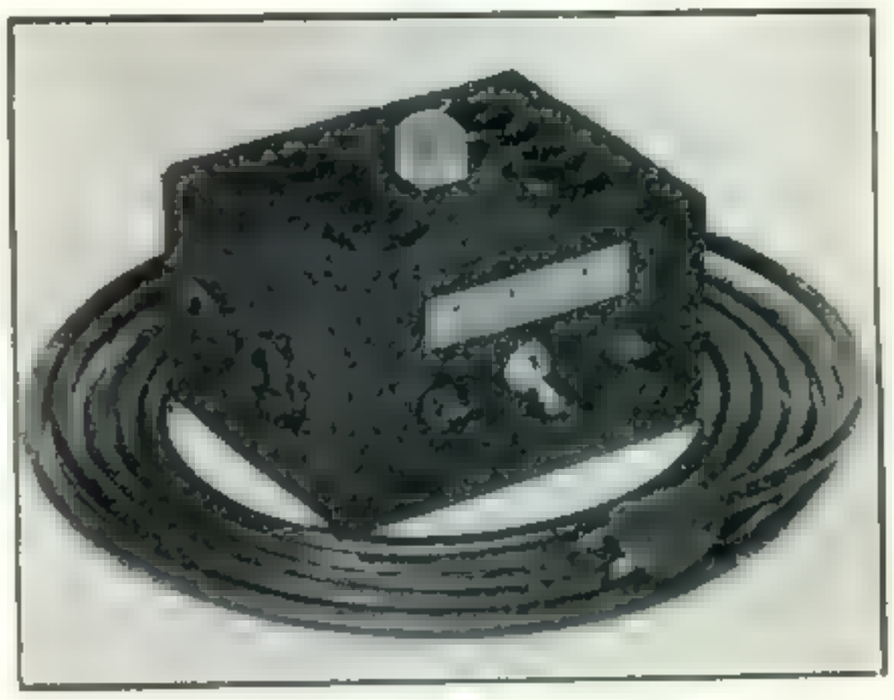
it may be used with a separate quench tube in a superregenerative circuit or as the h-f oscillator in a superhet. Since the plate power drain is 250 volts at 20 ma maximum, the oscillator is ideal for portable and mobile work.

The construction of the DM-240-A is brass, heavily silver plated. Multi-finger contacts to the electrodes of the 2C40 provide the low-loss connections necessary for maximum power output at this frequency.

Tuning of the oscillator is done by screw-type capacitors in the plate and cathode circuits. Feedback is smoothly controlled by a similar capacitor on the side of the oscillator. All coaxial circuits are rigidly positioned in manufacture, and no further "plumbing" is necessary. The variable output coupler is designed to feed RG-8/U cable directly.

Multi-Plug Outlet Box

Allied Laboratory's new multi-plug outlet box, Model 3001-A, is a small unit containing eight standard receptacles operated from a single connection to any wall outlet. The boxes can be pyramided

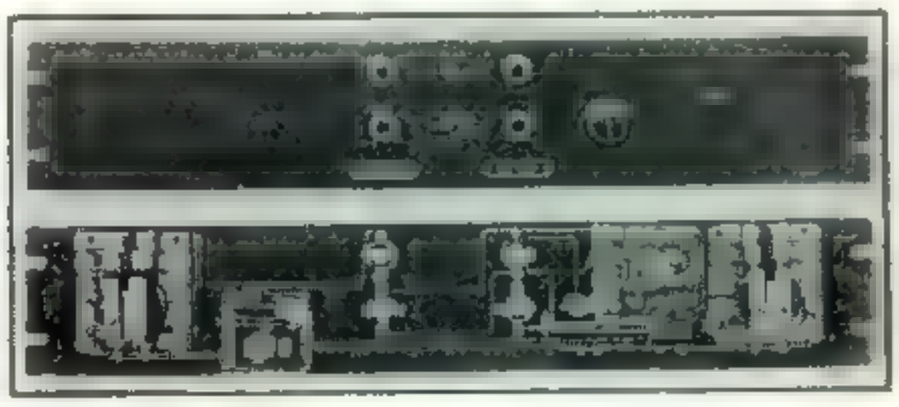


to provide still additional outlets. A neon pilot light indicates proper operation on all plugs. A long stroke toggle switch breaks both legs of the line, which is fused on both sides. All components are underwriters approved. Cabinet dimensions are 3″ x 4″ x 5″, net weight 1 lb. 9 oz. The unit can be supplied with female adapters for British-type plugs, and a plug for British-type receptacles. Model 3002-A is for use on 220-250 volts. The multi-plug outlet box is available from Sun Radio & Electronics Co. of N. Y.

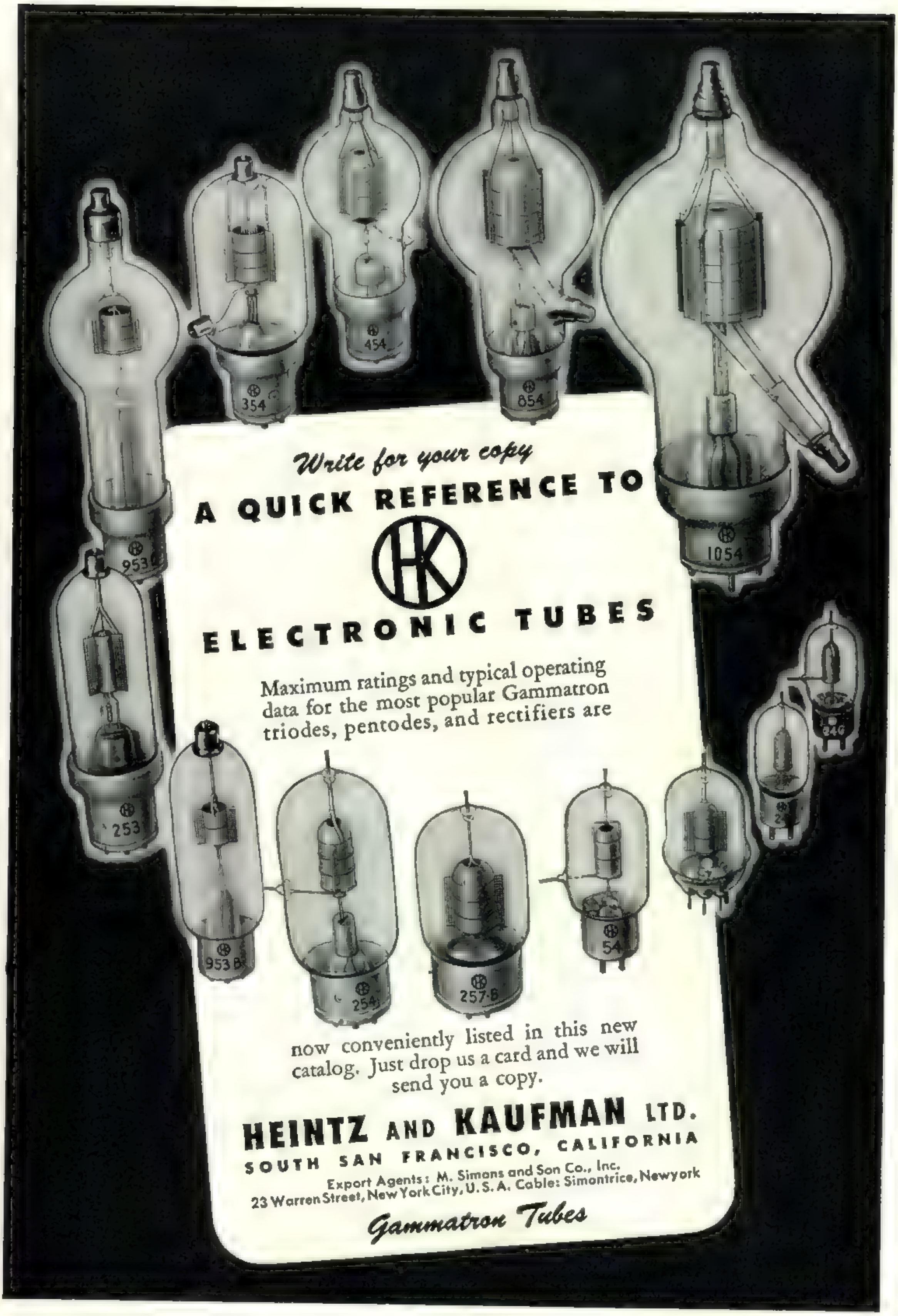
Transmitter Control Panel

Automatic control and protection in one compact panel for low, medium, and high-power ham rigs is now made available by Ward Leonard Electric Company, Mount Vernon, New York.

Offered in kit form or completely assembled and wired, this new transmitter control panel mounts directly on a standard relay rack. It gives full automatic protection against damage to tubes, transformers, and other gear from overloads and power failures. It gives finger tip control of filament and plate supply.



The Ward Leonard transmitter control panel includes one filament relay, double pole, 15 amp. contacts; one plate relay, double pole, 15 amp. contacts; one time delay relay; one overload relay; two push-buttons each for filament and plate supply. Panel size is 3½″ x 19″, with 1¾″ maximum depth behind panel, furnished in gray or black crackle finish. For 115 volts, 60 cycle a. c.



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Cond's'r:	10 Mfd.	1000-V.	Oil Filled (Rect. Case)...	$4.50
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Relay:	Leach No. 1077	6V.	DC..... D P D.T.....	1.75
Meter:	Aero Running Time 9999.9 Hrs.		3½" Round Case	4.50
Meter:	Hammerlund "S"		2" " "	2.75
Meter:	Burlington 150-V.	AC.....	2" " "	2.25

Tubes:	816.....$0.80	3C24-24G..$1.50	
	815..... 2.25	809 ..... 1.75	
	807..... .99	3E29..... 4.95	

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Input six or twelve volt DC. Frequency 27 to 38.9 MC. with 2½w output. Makes ideal 10 meter mobile transmitter. This has two (2) fixed channels which can be set on any xtal frequency from 27 to 38 9 MC. *(Note: The receiver is not tunable.)* Sold complete with 27 tubes and vibrators, but less handset and top and bottom covers

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DX PREDICTIONS

[*from page 37*]

hours CST and 1600 hours CST. 10 meters will probably close around 1700 hours CST. 20-meter conditions will be good between 0600-0800 hours and 2000-0200 hours CST.

The general outlook for conditions between United States and Central America and the West Indies indicate that the 10-meter band may open around 0900 hours EST. A peak period is forecast around 1600 hours EST on this band and a possible closing time around 1930 hours EST. The maximum usable frequency between United States and Europe is not expected to exceed 24.0 mc during this month. 20-meter conditions will be good from 0530 hours EST until 0730 hours and between 2000 hours and 0100 hours EST.

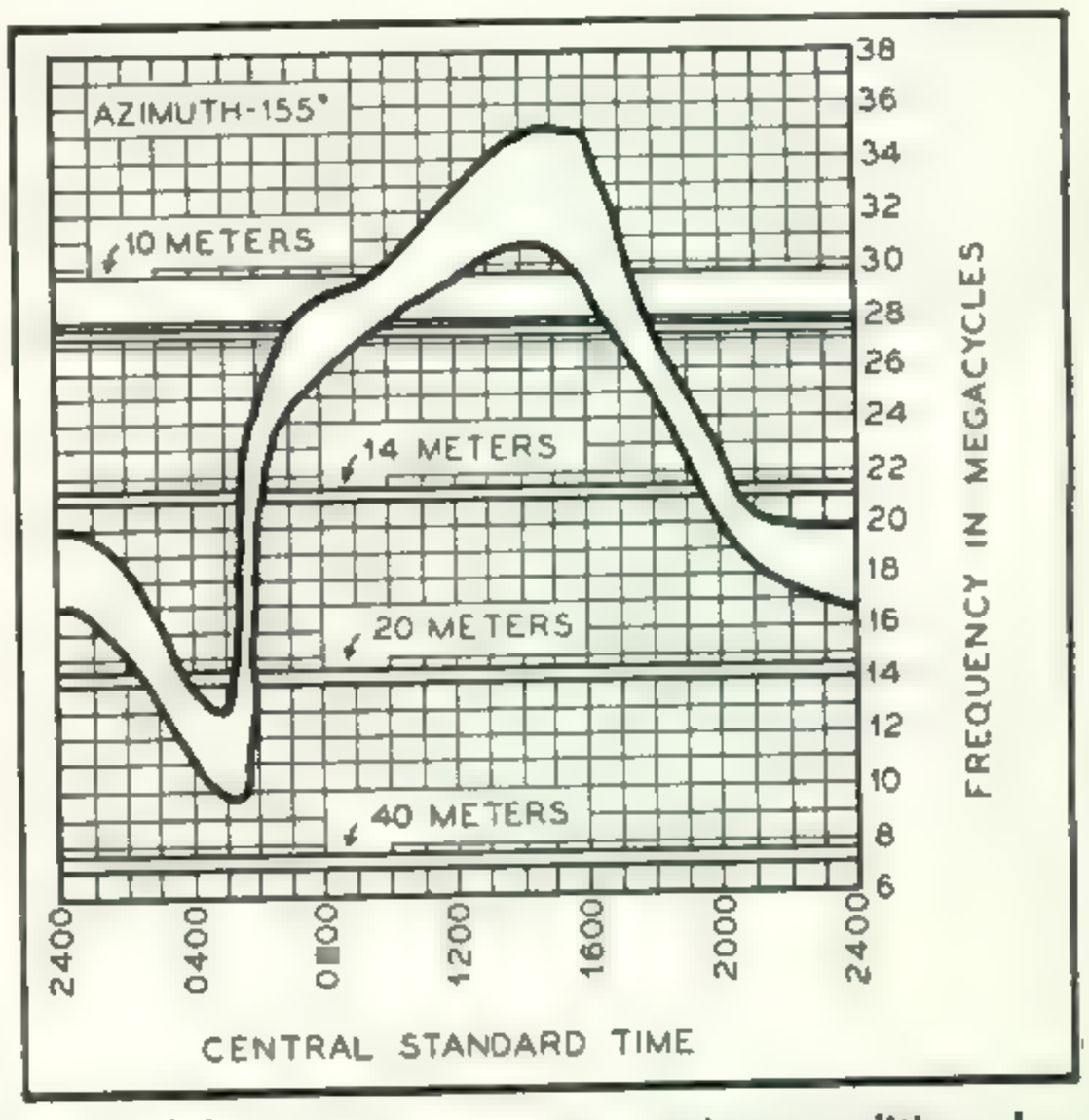


Fig. 3. July 1947 average propagation conditions between Central United States and South America.

The date for the predictions graphs are drawn from the *Basic Radio Propagation Predictions . . . Three Months in Advance* as issued by the C.R.P.L. of the National Bureau of Standards. These booklets are available on a subscription basis from the Superintendent of Documents, Washington 25, D.C.

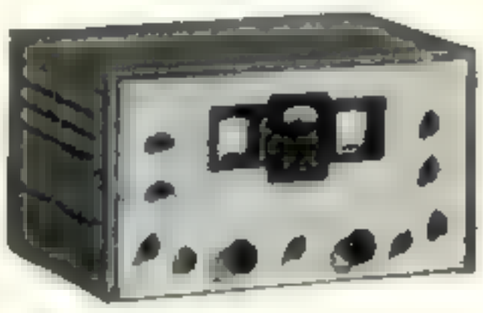
CQ DX

[*from page 40*]

Some of the boys have been working *W6RWQ/VR6* on Pitcairn Island. From what we have been able to gather, this fellow was on a cruise in the South Seas, and went ashore for a short time at Pitcairn. While ashore, he was on the air and put out a pretty good signal. Whether or not he used the old rig of VR6AY, or took something ashore with him is not known. At least, at this time, he seems to be O.K., and if any of you know anything to the contrary, let us hear about it. In other words, as long as he was on shore—O.K., on the boat—N.D.

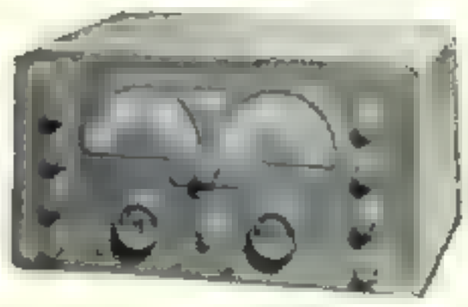
W1BIH worked W6RWQ/VR6 for country number 100 . . . Zones stand at 35. W6YYW is a new one in the column and has a nice list of 25Z and 53C. His latest was *W9IXQ/KS6* on Samoa, who puts in

With a Modern Communications Receiver!



Hammarlund HQ-129X

Hallicrafters SX-42



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National NC-46, with speaker	107.40	RME-84	98.70
National HRO, less speaker	274.35	RME-45, with speaker	198.70
Hallicrafters SX-42, less speaker	275.00	RME VHF-52 Converter	86.60
Hallicrafters S-38	47.50	RME DB-22 Preselector	60.00
Hallicrafters S-40A	89.50	Collins 75A-1 Receiver	375.00

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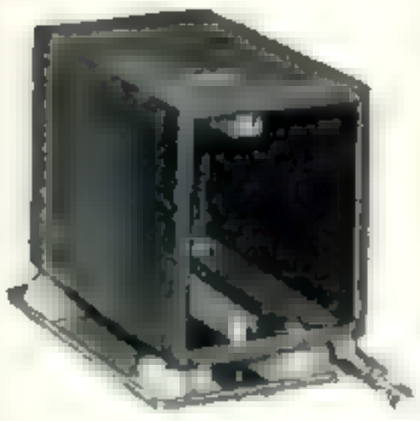

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a swell signal from a pair of 813s; frequency approximately 14,150. W6YYW runs 130 watts into an 829B, receiver is an NC-173. W2TJF kicks through with a nice list of 30Z and 74C. W6WKU is up to 38Z and 112C; the latest being *W6RWQ/VR6* and *VR5PL*. W4BRB now has 37Z and 120C.

W9RBI has picked up a few making 36Z and 103C. New ones are *VP2LA, YS3PL, W3EKK/VK9, TR1P, VK4NK*, and *PK6HA*. Ross has a new 3 element, 20-meter beam, and as he puts it, he is starting in to work somebody . . . and, he went QRO, too, from 150 to 175 watts!!! He says it is a lot of work cooking up this list of zones and countries. You're not fooling! I know it as well as anyone, but on the other hand, we are not asking for confirmations. And, speaking of work, you should see my committee pitch in checking all these lists which we are receiving.

W6ADP has been after them, hot and heavy, and has 39Z and 131C, with an all time total of 39Z and 162C. KP4KD now has 28Z and 75C with an all time total of 31Z and 106C. VK2ACX is in the Honor Roll with his 35Z and 85C, he runs about 50-watts input to a T40. The antenna is a 67′ Zepp.

W2GNQ has worked *C8YR* in Zone 23. He, likewise, has received a card and photo giving the following information. His QTH is 93° 30′ E, 39° 48′ N, Zone 23, QRA Box 73, Laochunmiao, Kansu Province, China. His name is Yu Ruey Chi. W6TI says that according to information he received from W7GUI, the stations signing *MX3KG* and *MX2AG* are in Korea, in spite of the fact that they have been signing the MX prefix. We don't know the full story on this deal, as yet, but apparently these fellows will be back in the States sometime in July, and we should get the low down then. In the meantime, until the status of these fellows is cleared up, we will not allow any credit.

A line from *HZ2TG* indicates he is on 14,000 kc almost every day, between 0200 and 0430 GCT. He will QSL 100% via WØZRA. He went on the air around April 22 . . . the transmitter consists of a 6L6 into a pair of 807s . . . receivers are HROs.

According to W6LRU in San Diego, W6MI has been doing a good piece of work in getting a *VK4BI* in Papua, *VQ8AE, KS4AC, PK6VR*, and *W2WMV/C9*. On 10 phone, he grabbed *W6NQG/KM6, HR1MB*, and *VP4TZ*. W6NIF has a new rotary which helped him get *VU2AR* and *VS7IT*. W6YYW is active, down that way, while W6GWY continues to work 20 DX phone, and is apparently too tired to work c.w. As for W6LRU, he has added some nice ones in *PK6VR, KS4AC, VQ8AD, CR7VAL, UAØKFC, W3EKK/VK9, GW3ZV*, and *OX3KF*.

W6OBD worked *W6RWQ/VR6*. Others recently worked are *VP8AD, W2WMV/C9, W6KE/KW6, K6SCJ/KP6*, and *J9ANJ*. W2GWE, is still at the top with 39Z and 165C. He certainly gets in there with both feet. Some of his latest include *ZS3F*, 14,100 in South West Africa, *W6RWQ/VR6*, ZA2A 13,995, *UR2KAA* 14,085, *CP1AP* 14,000, *UJ8AC* 14,050, *UH8AF* 14,000, *W6NQG/KM6*, *FB8AC* 14,136, *W3EKK/VK9, KS4AC*, and *ST2AM*. Oh, yes, one we couldn't leave out is *OY3IGO* whom he worked just after we notified him that OY3G had been taken off his list as a NG.

W6TI is up to 37Z and 97C. Some of his latest are *W6RWQ/VR6, W6WSC/KW6, VR5PL, UR2KAA, HK1BZ*, and *EK1AA*. W6AM sent in his list with 35Z and 87C, with an all time total of 36Z and 104C. W6SAI has worked a flock of new ones and is awaiting one QSL for his WAZ certificate.

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872A & Socket 2.90, 954/50c @ . ..	five for	2.00

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ADDITIONAL SET OF SPARE TUBES.		4.95
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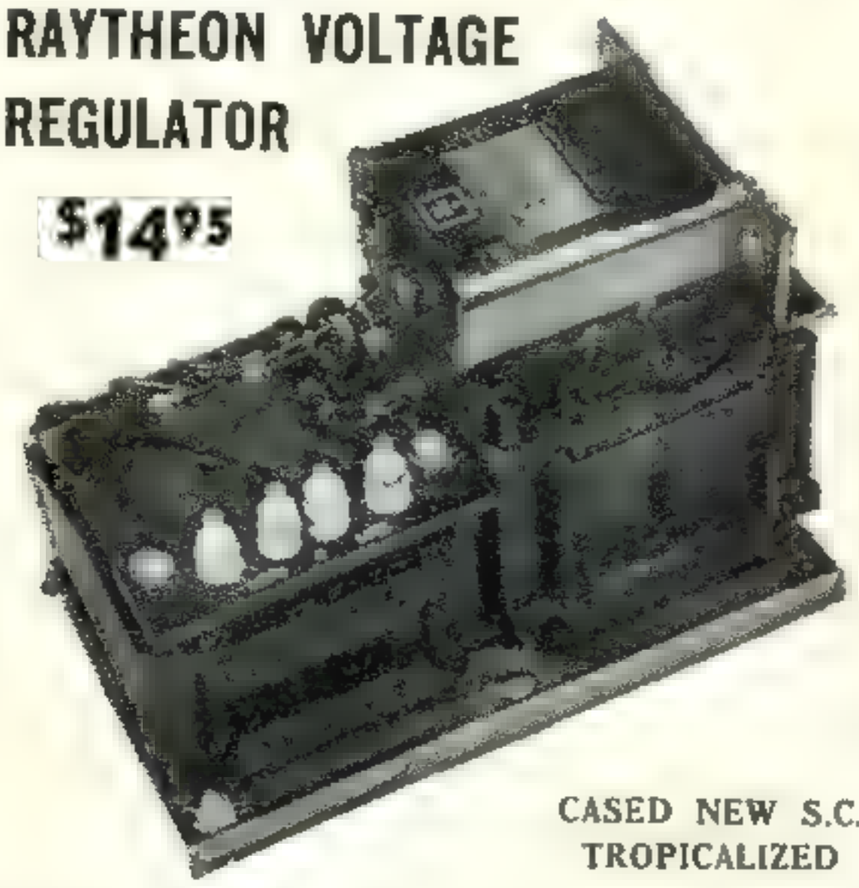

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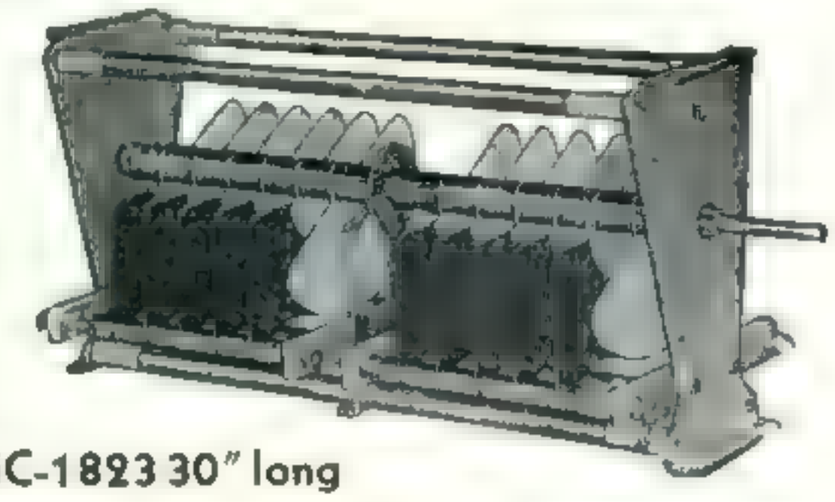
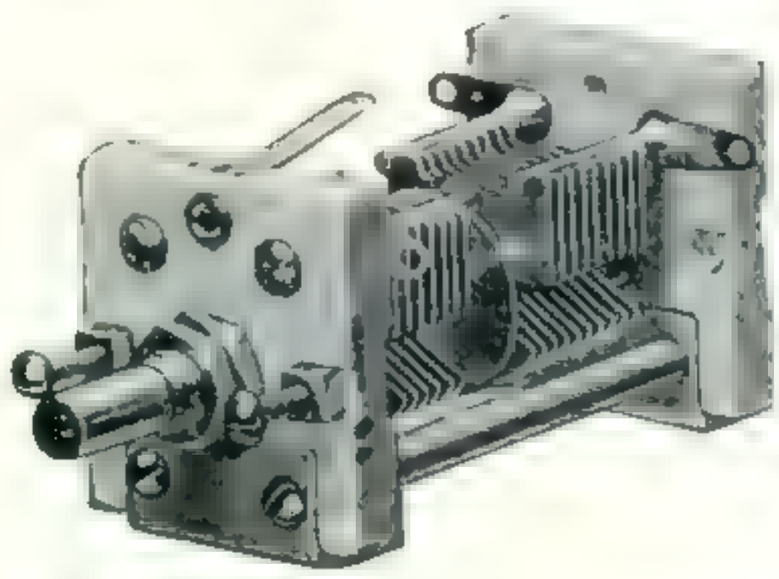


GC-1823 30" long



LC-1640 1" long

See your local distributor for information on the complete BUD condenser line. Ask him to show you the many differences that make this line so perfect for your use.

**TT's -Transmitter Troubles

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From *HZ1AB* we learn that they are employed by TWA to work for the Army AACS station in Arabia. The two maintenance men are Bill Bracken and Angelo (Mike) Buta, who is W4JEG. The five operators are Bob Thanisch, Bob Henney, Bob Toplak, Frank Hayes, and Jimmy Chuey. Their station chief is John Anderson. The transmitter is a Collins with about 400 watts input, and the receivers are Super-Pros. Mike says that since they are somewhat under-staffed, they do not get a chance to operate on the Ham bands very often. They are located about three miles from the Persian Gulf, and on a clear day, they can see the Bahrein Islands where VU7JU, VU7AB, and VU7BR are located. Mike also says that even though we may think there is no QRM, we should hear some of the "local" stations from India, Africa, Australia, and Europe. They generally operate c.w. on 14,080, and can switch to phone on the same frequency or go to 14,330. They also use 28,300 on phone with 90 watts input . . . their antenna being a long wire. On 20 meters, the antenna is a vertical about 70′ long. The transmitter they use for Ham operation is one of the ten channel Collins Autotune which can be dialed to any of the ten frequencies. Normally, this is the emergency transmitter in case one of the main transmitters goes off the air. They must have quite a plant there with so many different types of transmitters for use on various communication circuits.

J9ABX is now vice-president of the club on Okinawa. Bill says that many of the stations, whom they work, refer to Okinawa as the "rock." He says he personally doesn't think it is, as there is plenty of green on the island, which is 70 miles long. It is not tropical, but they do have a lot of rain, although not as much as in the Philippines or on Guam. It is definitely not a rock like Iwo Jima. Bill also adds that in sending cards to Okinawa, it is not necessary to address all the cards to J9AAK, instead, simply address your card to the station you worked, along with APO 239 % Postmaster San Francisco.

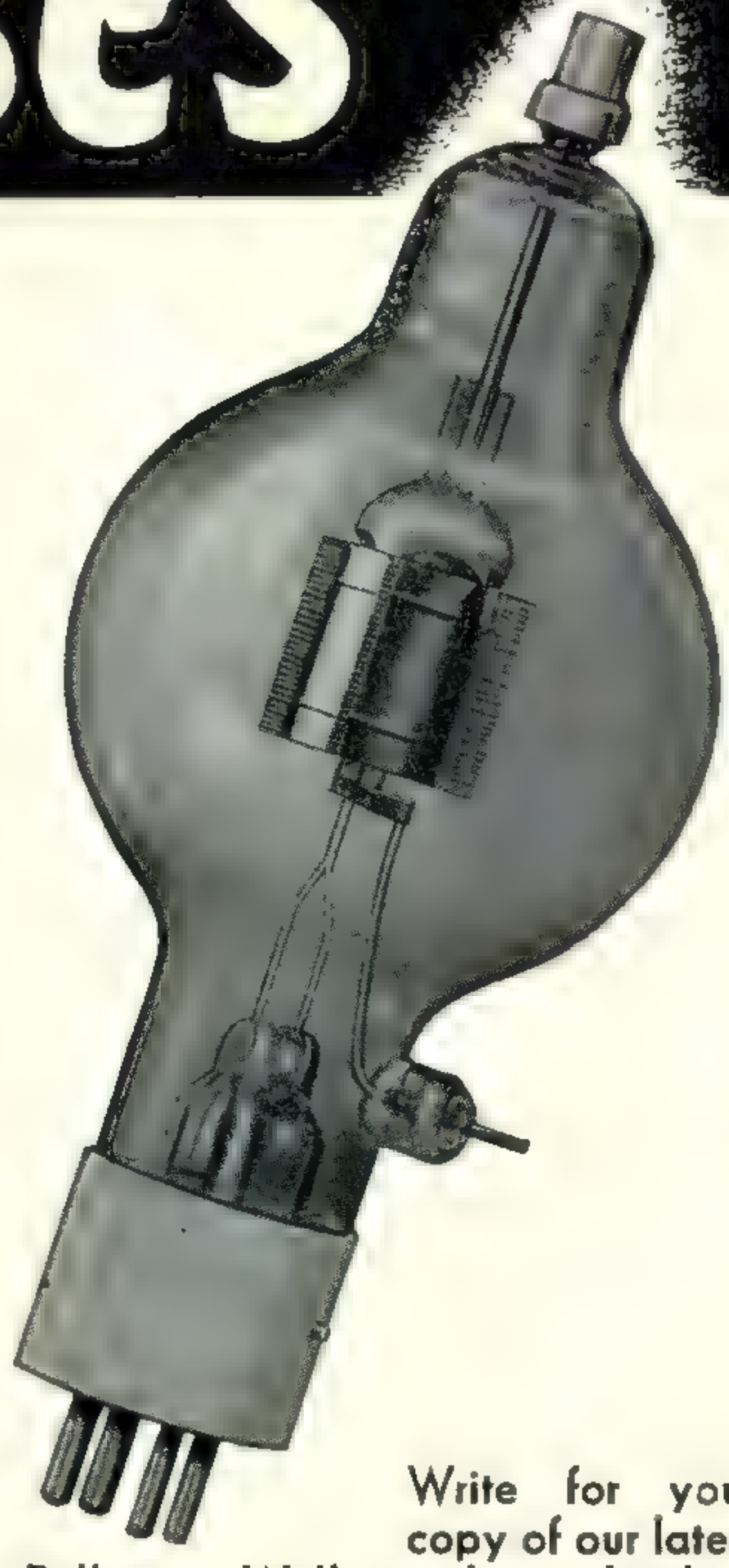
W6QJI/Ø gets pretty disgusted with the way a lot of the DX hogs clamp down on some rare station. I believe a little more intelligent listening by everyone on the frequency of these DX stations would help a great deal in eliminating QRM. This is especially true regarding the fellows who are calling DX stations at the same time the station is QSO. All of us hear this thing going on everyday.

CR9AG has received his old call *VS6AG*, and will use that in Hongkong very shortly. Normally he should use 50 watts, but, then again, John may feel like being a little abnormal once in a while. He says CR9AN has had quite a seige in the hospital, but should be back after his share of the DX, soon.

According to W3DF, George Sterling, Chief Engineer of the F.C.C., the breakdown of the call letters of amateur stations in Czechoslovakia goes something like this. The prefix, of course, is OK; the figure "1" indicated territory of Bohemia; the figure "2", that of Moravia; and the figure "3," Slovakia. The numbers are then followed by two, and in exceptional cases, three letters. There are approximately 300 amateurs transmitting stations in Czechoslovakia. They are classified into three groups: A, B, and C. They are graded by their ability and knowledge. Class A are licensed for 100 watts, class B-50 watts, class C-5 watts. Czechoslovakian experimental stations whose calls are formed with the prefix OK, and with numbers 4, 6, or 7, and the other letters, are allowed to communicate with amateur transmitting stations.

[*Continued on page 58*]

TUBES



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Wherever the Circuit Says Ω

W6SN hops up to 39Z and 124C with an all time total of 39Z and 147C. Bill grabbed *UAØKFC* for Zone 19. New countries include *EK1TF, OE9AA, CT1JS, VR5PL, UR2KAA*, and the fellow on Pitcairn. W7FNK now has 34Z and 54C with an all time total of 36Z and 54C. W8NBK has 35Z and 111C, some of those which helped him get there are *UA9CB, VS7IT, VK4BI, FT4AN*, and *UH8AF*. W8CVU picked up *UA9CB* in 17 giving him 37Z and 104C. WØGKS went out and picked up *UAØKQA* for his 39Z, and his countries are up to 109 . . . all time, it's 39Z and 136C. Doc would have had one more country if OY3G had only been a good one. WØAZT has 31Z and 75C. Some of his newest include *VS6AZ, UAØKTU, VQ2JC, PK6AX, W3EKK/VK9, FR8VX, CN8EZ*, and *I1MQ*.

Col. Roland O. Akre, W4ZZZ, after flying two miles above the North Pole in a B-29 at approximately 290715Z, gives the following report:

The sun was above the horizon and it got dark about five hours later on the return flight. Temperature was –25° F at airplane altitude, weather CAVU. The circle made over the Pole took us through all time zones in about five minutes. Propagation conditions were poor with no signals on 80 or lower. 40 had a few signals with foreign phone stations predominant. W6VOQ and W4CT' were heard, also W4IKK, VE8GVE and VE8MU. 20 meters had several c-w signals. One W6 phone was heard but due to multiple path transmission, or echo effects, it could not be identified. A Philippine phone station was QSA5. G5RV was heard on c.w. C-W signals had a ringing or shadow effect. WWV could not be heard on 5, 10 or 15. Signals from shortwave broadcast stations between 15 and 18 mc were terrific, but almost impossible to distinguish whether foreign or U. S. due to echo effects.

W6SA picked up 13 new ones giving him 39Z and 127C. Some of his best are *CR8AC*, 14100, (this one is a honey), *PZ1OY, VK4NK, CT1JS, UD6BM, UR2KAA*, and *VR5PL*. W6LER is up to 38Z and 96C. His latest and best include *ZD1KR, KV4AA, UB5AC*, and *OE9AA*. W3EVW worked *UC2AC, ZD2K, KS4AC, ZD3B, HR1AT, HP4Q, YI2AM*, and *VR5PL*, plus *UAØKQA* in Zone 19, giving him 37Z and 111C, and a grand total of 39Z and 146C. W8HYC goes to town and adds a flock of countries, bringing him up to 39Z and 145C. His all time total isn't much higher . . . 39Z and 154C. A few of his best are *TA3SO, UJ8AD, CR4SS, VU7BR, UO5AC, UC2AC, VS6AC*, and *UH8AF*. Glen has 38 zones confirmed. W9YNB (where the heck are the W9 DX men?) is doing a pretty good job with his 36Z and 88C.

If this column seems to you as though it is more disconnected than usual, you're probably right. We started milling the stuff out, early in the month, due to a two weeks jaunt to Chicago. This thing, that occurs in Chicago each May, as everyone who has been there will tell you, is a mad house. It's the annual Radio and Electronic Parts Show, and it seems that all of the manufacturers, distributors, and representatives take this occasion to congregate in the huge Stevens Hotel and begin six days of chasing each other around.

It was very enjoyable, since you bump into Hams where you least expect them. Among the gang we met were Fred Schnell, W9UZ; Al Kahn, W9KYM; George Sterling, W3DF, Chief Engineer of the F.C.C., W9NLP, and, of all people, who should show up but W1SZ, one of the best DX'ers of all time. Back in LA now, so see you on the low end. 73.

[*DX QTHs on page 60*]

"Communications"

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1KW pulse output on 154 to 186mc 117 VAC power supply Can be converted to CW or Voice operation without difficulty and easily lowered to 144-148mc band 5 stagger tuned receiver IF stages make for ready adaptability to FM or TV. Can be used as a low power Radar set.

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872A	2.98	861	85.00
705A	6.75	705A Sockets	.65

Cathode Ray Tubes

3BP1 ..	$3.95	5CP1	$4.95
3FP7	2.98	5FP7 .	3.50
5BP1	4.95	5JP2.....	8.95

RCA 12 Tube Superhet

100 to 1500KC. 115V AC operation Dim: 24"x18"x15". Used: in excellent condition guaranteed . **$29.95**

Selsyns—Type 5G 115V, 60C AC Dim: 3¼"x 5½". Special a pair **$7.75**

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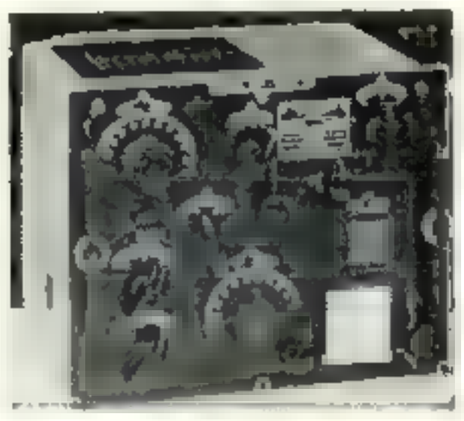
Solenoid contactor 24VDC Leach	1.05
Thermal delay, 45 to 60 sec. Edison type 1503 with 4 prong base	2.95

Ideal Basis For E.C.O. Rig



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Amertran RMS test 15KV, 1 Hy. 8 amp DC, DC resistance 7.5 ohms	8.95
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Dual: 7Hy. 75ma, 11Hy. 60ma, 1780V test	1.95

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Rectifier Transformer

117VAC input—62V out at 3.5A. Rectify and use with filter and rheostat to run your 6, 12 and 24VDC equipment . **$3.95**

Vibrator Transformer Primary: 6, 12 and 24V; secondaries (2) 120V @175ma. 1) 11V. Dimensions: 3.25"x3"x3" **$1.00**

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1 mf 300 vdc....$	.20	.1&.5 mf 2000 vdc	1.25
2 mf 300 vdc....	.25	10 mf 600 vdc...	.85
4 mf 300 vdc....	.30	1 mf 1000 vdc...	.75
4 mf 400 vdc	.50	.1 mf 1000 vdc	.25
5-5 mf 400 vdc	1.05	2 mf 1000 vdc	89
1 mf 500 vdc GE	.25	4 mf 1000 vdc ..	1.00
2 mf 550 vdc	.25	10 mf 1000 vdc	1.40
25 mf 600 vdc ..	.20	1 mf 1500 vdc...	.95
85 mf 600 vdc	.25	4 mf 1500 vdc	.15
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V.H.F.-U.H.F.

[*from page 46*]

receiving. So far no one on in K.C.

W8QYD in Dayton says that W4JBF in Ky. is now on 6. W8QYD is doing o.k. with WØKYF on bending. In Western Texas, W5BGT, in Excell, Texas, is ground wave for W5WX and W5HF, 35 mi. away.

Todd Storz, WØDYG, has been giving the gang their Nebr. contact. Todd has 600 watts to 810s on 50.040 kc and a long wire. WØWOW/4 at Farmville, N. C., is now on c.w. with 300 watts to a 4-element wide spaced beam and has worked the Raleigh gang.

Ed Rimathe, WØTIO, worked WØCHI, YKX on bending about 100 mi., using three Vees stacked, running E-W. Wonder what will happen when Ed and W7ACD with his 487′ Vee clash?

The first YL report is from Alice Bourke, W9ENP. Alice has her antenna on the 46th floor of the Skyliner Hotel in Chicago and will be on for the DX—watch out all aircraft!!

W4FBH, near Atlanta, has worked W4HVD and W4EQM in Ala., ground wave, about 85 mi. Roy has a new 5-element composite beam on a 60′ tower, and the 2-meter 5-element stacked above it.

144-mc Gang

As mentioned before the reports on 144 mc are sadly lacking, come on gang give with the news.

While in Chicago we had occasion to take in a meeting of the V-H-F Club, which is composed of practically all 2-meter enthusiasts. Here is a real start for promoting v-h-f activity, and we can say the Club is really on the ball. Each meeting they iron out mutual problems and have good talks from either engineers or from their own ranks.

From the Chicago Parts Show we also got the gossip about W8UKS's nice antenna array coming down. The report came fron an engineer on a train who goes by Sam's house all the time, and used to admire same. One day tho the sky was clear around Lakewood, so 5 blasts were given in mourning for Sam's antenna array.

We also heard of the misfortune of W3HWN who was greasing his rotating mechanism for the 16-element 2-meter array, on his 80′ tower. The wind blew the antenna while Paul's finger was in the gear box and took off the end of one of his fingers. The shock almost made Paul miss his footing but as all 2-meter men live right, he was saved from a very bad, if not fatal fall. Glad it wasn't more serious Paul.

Fron Bill McNatt's *Mid-West V-H-F News* we find the issue in the Chicago area is who is going to get across the lake on 2 meters first. Skeds are under way with W8VIB and others. Bill also says that only one of about 50 fellows on 144 mc there have other than a 522.

W6CZB up 4115′ in the high Sierras has worked into Frisco, Redwood City, Vallejo, Corning, Walnut Grove, Ripon, Stockton and Sacramento. He uses a WERS transcvr, and a folded dipole FD of copper tubing, on a hudred foot pine tree. He also mentions the lower freq bands are almost always open for him when the boys in the valley find them fairly dead.

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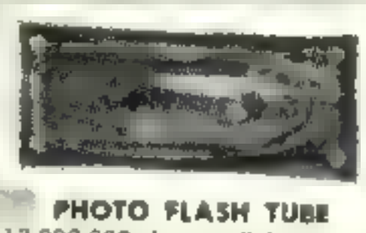

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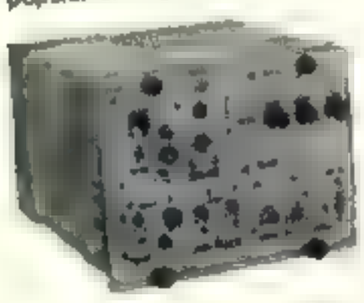

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DC Resistance—Pri 135 ohms Sec. #1, 112 ohms, Sec. #2, 99 ohms.
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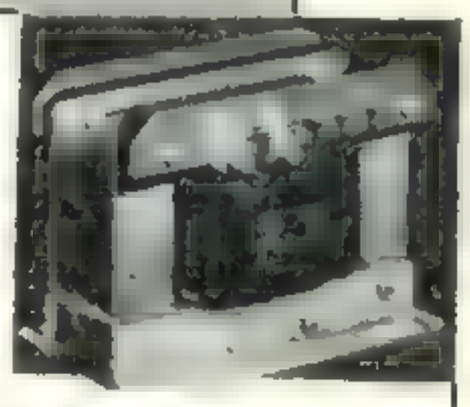

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WØINI, near Kansas City, is now on 144,990 kc with a 522, 3-element horizontal beam and VHF-152, Harry provides a DX contact for the K.C. boys.

W1MZC in Holden, Mass., worked W1MNF at E. Orleans on Cape Cod 100 miles, sigs R-5, S-8, using 10 watts. He will have a screen reflector on a 40 windmill tower and xtal rig going soon.

Jim Brannin, W6OVK has a scheme for a Calif. State 2-meter relay link under way, and looks like this summer may see his aims realized. The route will be from Red Bluff to San Diego, via Fresno and Barkerfield. Any helpers for this job? Running out of space and 6 is hot so see you next month. 73.

ZERO BIAS

[*from page 11*]

But even more commonly overheard on the amateur bands, is the expression of opinion about equipment, both home-made and commercial in origin. An innocuous remark about "such-and-such" a manufacturer's junk receiver can do incalculable damage to a product's reputation. No one, not even the manufacturer of a piece of gear being criticized would rightly object to honest criticism or a statement of opinion on the air. The last thing we want to advocate is self-censorship, what we ask for is discretion.

All of us have met at some time or other an individual who knows it all. Some hams naturally fall into this category and constitute themselves a one-man bureau of standards. These individuals have taken it upon themselves to say the most disparaging things about products they, as individuals, don't like. This sort of thing is rather like a discussion among car owners as to whether they like a Ford, Chevy, or Plymouth best . . . seldom do they agree, yet all cars give fine serviceable performance. The same holds for ham equipment, and cracks knocking gear, especially on the air, does no one any good.

Unless on pretty firm ground the amateur doing the talking is actually performing a disservice to his fellow ham by not giving him the straight dope, and of course, he is doing the manufacturer a lot of harm. Newcomers or, as a matter of fact, other amateurs in all classes, listening in on such remarks cannot help but draw some sort of impression—either condemning the equipment, or the amateur for the statements.

Bear in mind that a single unit is not the criterion for an entire line. There are lemons in almost every production run. There are unforseen difficulties, shipping breakage—a multitude of things that can go wrong. It isn't fair to place the onus on anyone without exercising first the most considered discretion. One reason manufacturers have a guarantee is to help a customer should he encounter any unforeseen trouble. So next time you voice an opinion on equipment try to be rational in giving your advice and criticism. Be honest, that is all anyone can ask—and be reasonable.

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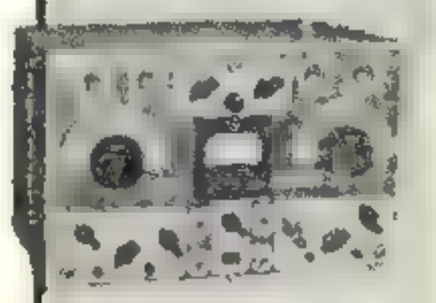


RCA

SUPREME

HICKOK

SOME OF HUNDREDS OF ITEMS AVAILABLE ON TIME PAYMENTS

RECEIVERS

NATIONAL

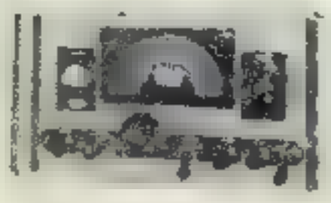
Description	Price	Down Paym't.	*Per Mo.
NC-173T, With Speaker	$189 50	$37 94	$13.39
NC2-40-DT, With Speaker	241.44	48 36	17 06
NC-46, With Speaker	107 40	21 48	7.59
HRO-5TA1, w/Pow. Supply	697 294.71	59.03	20.82
HALLICRAFTERS			
S-40A, Receiver	89.50	17.98	6.32
SX-42, With R42 Speaker	304.50	60 90	21 52
SP-44, Panoramic Adapter	99.50	19.94	7.03
HAMMARLUND			
SPC-400X, w/Speaker in Cab.	347.25	69 45	24.54
HQ-129X, w/Speaker in Cab.	173.25	34 65	12.24
R. M. E.			
UHF-152, Hi. Freq. Conv.	86.60	17.36	6.11
RME-84, Complete	98.70	19.74	6.97
RME-45, Complete	198.70	39.70	14.04
COLLINS			
75A-1, Receiver	530.00	106.04	37.44

TRANSMITTERS

COLLINS			
30K1, Transmitter	1825.00	365.08	128.96
32V1, Transmitter	590.00	118.04	41.69
HALLICRAFTERS			
HT9, 100 Watt Transmitter	350.00	70 00	24.67
TEMPCO			
75GA, 75 Watt Transmitter	495.00	99.00	34.98
500GA, 500 Watt Transmitter	1500 00	300.00	106.00
SUPREME		**JOHN MECK**	
AF-100, 100 W. Xmtr. Comp.	450.00	90.00	31.80
T60-1, 60 Watt Transmitter	150.00	30.00	10 60
SONAR			
VFX-680, All Band Exciter	87.45	17.49	6.17

TEST-EQUIPMENT

R. C. A. Description	Price	Down Paym't.	*Per Mo.
155-C, 3" Oscillograph	115.00	23.08	8.11
160-B, 5" Oscillograph	185.00	37 04	13.07
162-C, Channalyst	162.50	32 54	11.48
WV-75A, Voltohmyst	125.00	25.04	8.83
WA54A, Audio Oscillator	152.50	30.58	10.77
SUPREME			
546A, 3" Oscilloscope	87.95	17 63	6.21
561, Oscillator	133.87	26.83	9.46
HICKOK			
191X, Microvolt Generator	145.92	29 28	10.30
305, Oscillograph & Oscil.	145.50	29 10	10.28
288X, Signal Generator	159.06	31.86	11 23
534, Tube & Set Tester	138 30	27.66	9.77
JACKSON			
652, Audio Oscillator	117.00	23.40	8 27
WESTON			
798, Tube Check. & Analyzer	187.09	37.45	13.22
785, Circuit Tester	103.59	20.79	7.32
TRIPLETT			
2432, Signal Generator	86.73	17.37	6.13
1632, Signal Generator	107.80	21.64	7.61
PRECISION			
954P, Port. Tube & Set Tester	97.22	19.46	6 87
DUMONT			
164E, 3" Oscillograph	105.00	21.00	7.42
208B, 5" Oscillograph	235.00	47.08	16.60
274, 5" Oscillograph	115.50	23.10	8.16
SIMPSON			
330, Tube Tester	96 53	19 37	6 81
415, Signal Generator	112.70	22 58	7.96



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$5 Deposit with Your Order Now Will Reserve Your Equipment

Shipments F.O.B. N.Y. or Chicago

*Includes 6% carrying charge.
Prices subject to change.

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NEWARK ELECTRIC COMPANY, INC.

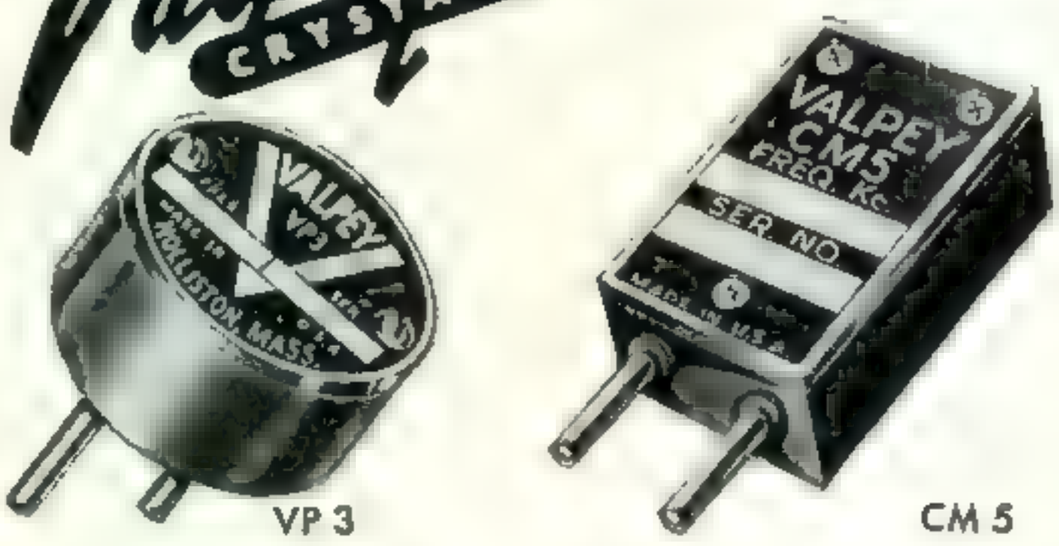
CHICAGO
323 W. Madison St.
Chicago 6, Ill.

NATIONAL

New York City Stores: 115-17 W. 45th St. & 212 Fulton St.

Valpey CRYSTALS

tip #2



VP 3 CM 5

"CRYSTAL HEATING"

"Low Drift" crystals can change frequency by as much as .02% from excessive heating.

Careful positioning of crystal can prevent external heating. Internal heating which is usually present but unsuspected is caused by excessive feedback, (common to 6L6 circuits), too high grid-leak bias or feedback from following stages.

Use a grid-leak around 10000 ohms on pentodes with 200-400 ohms in cathode suitably bypassed. On triodes, shunt the crystal with an RF choke and bias the cathode.

VALPEY CRYSTAL CORP.
HOLLISTON, MASSACHUSETTS
Craftsmanship In Crystals Since 1931
W1ATP W1HVP W1BZJ W1PLX W1ONF

SELSYN MOTORS

FOR ROTARY BEAM INDICATION

$2.95 PAIR
Add 15¢ for Packing and Postage

STOCK NO. B-407-C

BRAND NEW - General Railways Signal Co.
Selsyn Transmitter and Indicator

- Operate from 115 volt 60 cycle thru a 300 ohm 20 watt resistor or 40 watt lamp. (Diagram furnished)
- ½" long shaft threaded for 6-40 nuts.
- Quick disconnect plugs.
- Small in size (2¼" dia x 4½" long) and light in weight (20 oz.).
- Other uses - remote indication of liquid levels in tanks, remote wind direction indicators, remote signaling, etc.

TERMS --- Orders under $3.00, cash with order; orders over $3.00 require 20% deposit --- balance C. O. D.

SREPCO
STANDARD RADIO & ELECTRONIC PRODUCTS CO.
135 E. SECOND ST — DAYTON 2, OHIO.

FREQUENCY STANDARD

[*from page 36*]

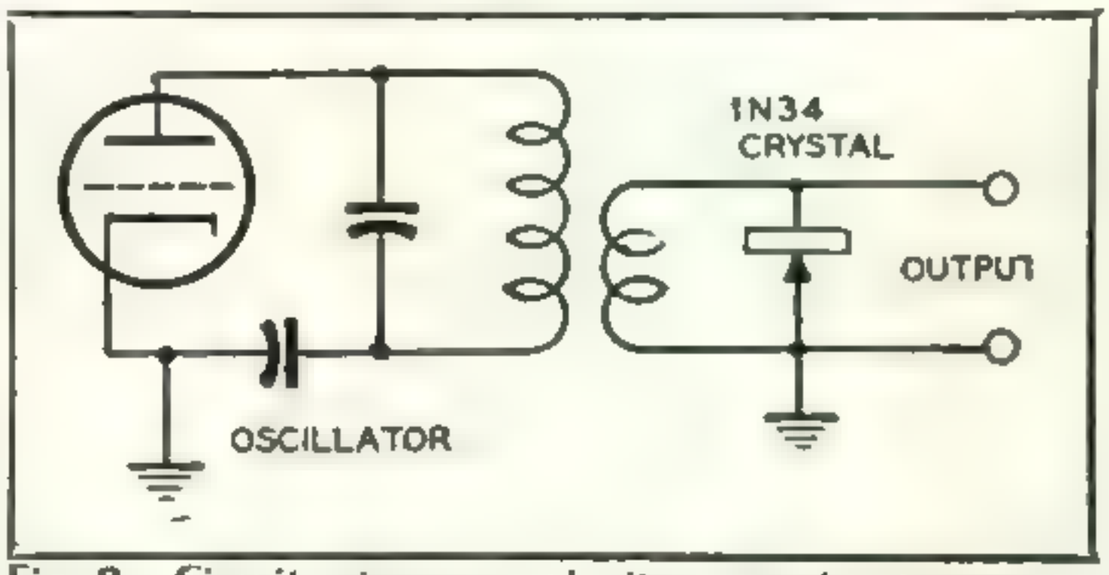


Fig. 2. Circuit diagram of the simple frequency standard. When a d-c meter is inserted in series with the 1N34 crystal link the total current flow should be less than 20 ma.

model were pie-wound on a machine and the inductance checked on a *Q* meter. A 2.5 mh r-f choke would be suitable if tapped between the first two pies and the capacitance *C4* increased. The new iron core forms available on the market are also well suited to this type of coil.

To check the standard, turn on the 1000-kc oscillator and tune *C2* until the crystal oscillates, as evidenced by the regulator tube brightening. Couple the receiver and tune to WWV at 5.0 mc. Adjust *C1*, and if necessary *C2*, until a beat is heard. The receiver beat oscillator should be off. Pick a period when the 400-cycle modulation is off the WWV carrier to prevent an extra beat. With some crystals *C1* may not actually be necessary to bring the crystal to zero beat, but it is advisable to include the condenser in the circuit.

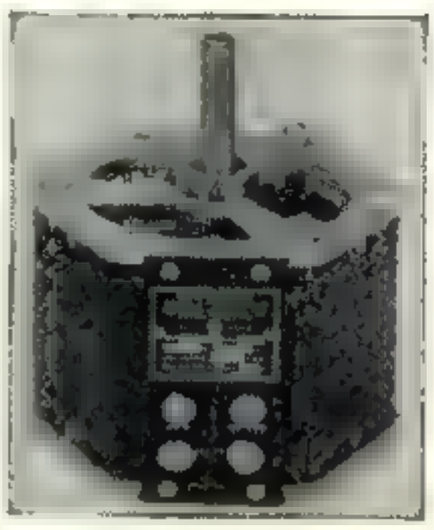
Next turn off the 1000-kc oscillator and turn on the 100-kc standard. Oscillation may be checked by shorting the grid of the 100-kc oscillator and watching for a flicker in the regulator tube. Tune *C5* until a beat is heard on WWV. Check points at 2.5 mc and 3.0 mc to see that the beats are 100 kc apart. If the signals are not 100 kc apart the inductance *L1* and condensers *C4* and *C5* may need adjusting.

The two oscillators may now be brought to zero beat with WWV and the signal harmonics used for calibration. It is best to allow a short warm-up period before operation. In normal cases, the 100-kc oscillator will lock in with the 1000-kc oscillator, making further adjustments of the 100-kc standard unnecessary. Coupling to the receiver may be adjusted to give the desired signal strengths. At low frequencies, very little coupling is needed.

Undoubtedly the straightforward principle in generating harmonics in 1N34 crystals can be applied in many ways. A standard has been built for the v.h.f. using 1000-kc and 10,000-kc crystals. This produced harmonics every 1 mc well above 200 mc.

WAR SURPLUS SALES

RADIO - ELECTRICAL - ELECTRONIC EQUIPMENT - PARTS - SUPPLIES



SUPERIOR 2 KVA POWERSTATS

SUPERIOR 2 KVA Powerstats; input 115 volts 50-60 cycle—output voltage range 0-135 volts; maximum rated output current 15 amp. available over entire range of output voltage; weighs approx. 20 lbs. **$29.50**

SUPERIOR 2 KVA 3½ KW powerstats 2 in tandem, each 115 volt AC single phase. Same as the above but twice the input and output voltage 45 lbs. **54.50**

BEEDE METER, New, in black finish bakelite case, 3" round; 0-1000 MA DC. While they last only..... **1.95**

GENERAL ELECTRIC 0-30 DC Milliammeter—3" bakelite case..... **3.50**

French Type Phone TS-13C Hand Set

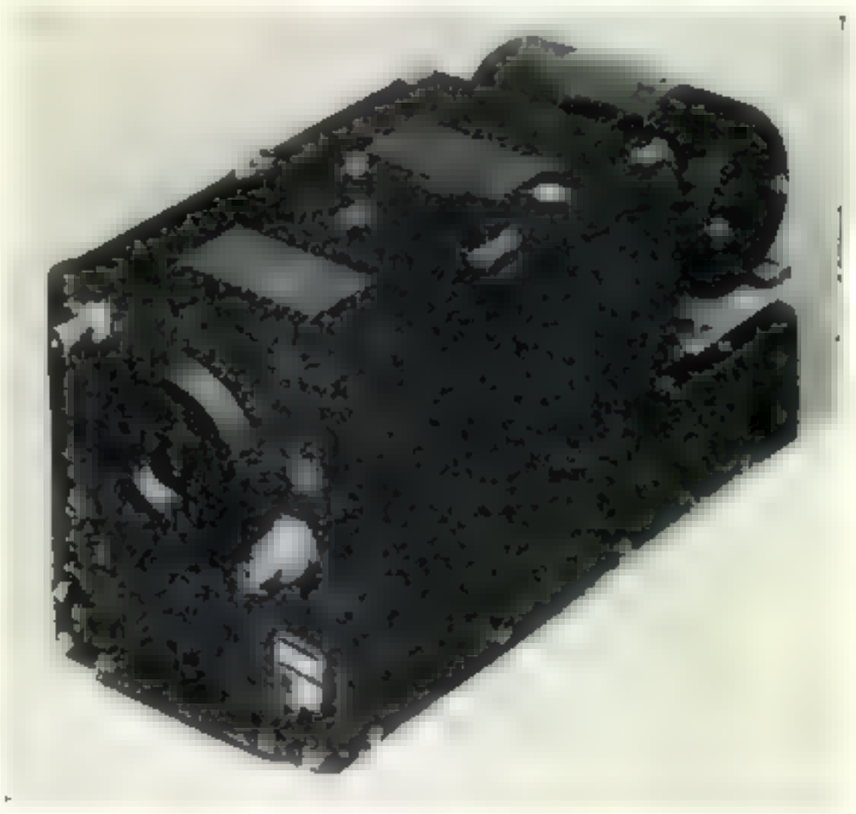
With butterfly switch on handle. When the switch is pressed, the microphone is connected into the circuit and an additional set of contacts are closed, to operate a changeover relay. Has a 6-ft. length of cord, with a PL 55 p ug for earphone and PL 68 for microphone and switch. Impedance of earphone approx 2500 Ohm; impedance of microphone approx. 250 Ohm (carbon); connected with batteries it can be used for inter-communication system. They are brand new and the original cost is many times what we are offering them to you . . . while they last..... **$3.95**

Brand New **GENERAL ELECTRIC Tungar Battery Chargers**

Model No. 6R-B33B2—1 to 12—6 volt batteries; 6 amp DC 115v AC, 60 cycle; complete with Tungar Bulb. Shipping weight approx. 40 lbs..... **29.50**

JENSEN P.M. 4" Speaker; 4 to 6 ohm. All brand new. Special . . **95c**

CRYSTAL DIODES 1N21B(1N34) See Radio News May Issue page 50. Each 50c or 3 for $1.25.



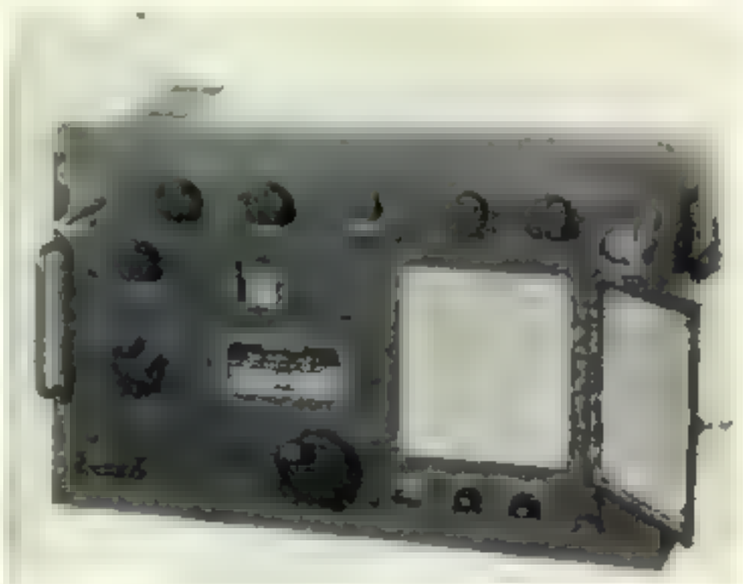
6 TUBE Brand New Receiver with tubes Only $5.95

Receivers of the SCR-274-N/(AN/ARC-5) Series. All-aluminum aircraft receivers 5" wide, 8" high, 12½" long; weight 6½ lbs. Typical tube line-up is 12SK7 RF, 12K8 Converter, two 12SK7 IF's, 12SR7 Detector and BFO, 12A6 Output, gas-filled antenna signal voltage limiter, and gas-filled output signal voltage limiter. Each set comes complete with all tubes in sockets. Item 1: 3 to 6 Meg. less dynamotor; Item 2: 6 to 9 1 Meg. less dynamotor. The dynamotor **$1.95**

Crystal Calibrated Signal Generator 1-222-A $54.50

Operation from 110-117 volts, 60 cycles, consumes 40 watts. Self-contained power supply.

COMPLETE WITH TUBES



Within the IF ranges of FM and Television sets.

A combination signal generator and heterodyne wavemeter. Consists of a 5 mc crystal-controlled oscillator used as a frequency standard, a variable oscillator, an untuned detector with two stages of a.f, a sliding-rod stub antenna, a rough pi-type RF attenuator, a calibration chart and a power supply The test oscillator covers 8 to 15 mc and 45 yo 76 mc and since the third harmonic is utilized, also covers 135 to 230 mc. Cabinet measures 19½" wide, 12" high, 7½" deep; weight 50 lbs. Tube complement: 6J5 oscillator; 9006 detector, two 6SJ7; 9002 test oscillator- 5Y3G rectifier. An additional power supply and tubes with many other small items including cables packed in wooden chest is included in this price Gross weight of entire eq ip ment 490 lbs. While they last. **54.50**

RECTIFIER & BATTERY CHARGER COMBINATION

No. RA91A—Selenium plate, full wave 115 or 230v AC; 50-60 cycle, single phase input; output is 6 to 48v DC at 2 to 15 amp; manually controlled, complete with overload input and output switches. 0-15 amp DC meter Excellent for laboratories, servicemen, service stations. Shipping weight 150 lbs. Price.. **39.50**

WILCOX F3 6 Tube Receiver $13.95

Brand New, in original carton; complete with set of 3.5 to 6.1 meg. coils and set of spare tubes; 110 VAC 60 cycle. Tubes 2—6K7, 1—6K8, 1—6F7, 1—6C8G, 1—80. Weight 50 lbs.

The F3 receiver is a crystal controlled superheterodyne consisting of a single stage r-f amplifier an oscillator mixer, a single stage i-f amplifier, a second detector and a.v.c. voltage amplifier and an inter-carrier noise suppressor and audio output stage. The audio amplifier is capable of producing zero level db output across a 500 ohm load

Navy Standard Storage Battery

Brand New

Made by Gould Storage Battery Corp. 6 volt 15 amp hour. Excellent for amateurs, experimenters, radio servicemen, etc. Shipped dry, with complete instructions for charging. 4⅝ x 4¾ x 6¾ high. Shipping weight 12 lbs. While they last..... **$4.95**

Prompt Delivery—Write Dept. CQJU
25% deposit required on C.O.D. order
Shipped F.O.B. New York. Min. Order $2.00
Everything Brand New

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MODULATION & DRIVER TRANSFORMERS

These transformers are suitable for use with type 811, 809, TZ40, TZ20, etc. to modulate either triode or beam tube RF amplifiers. Two secondaries are provided. Impedance ratio primary to secondary number one, 2 to 1. Primary to secondary number two, 16 to 1. Will modulate up to 300 watts input. Modulation transformer, driver transformer, circuit diagrams and other information all for.....$6.90
Please include 50 cents for postage and handling.
Write for latest bargain bulletin listing bargains in filter condensers, chokes, transformers, vacuum condensers, switches and many other items.

Amateur Division
ELECTRONIC NAVIGATION, INC.
Box 735, Church Street Station
New York 8, New York

WAR SURPLUS

TUBES

6V6—Metal	$ .89
5Y3 GT	.45
No. 80	.45
Resistor Kit—½ & 1 W 100 Assorted	$2.00
Condenser Kit—.01—.00001 100	$3.00
Choke—12H—DC Res. 250 Ohms—80 MA DC	$1.09

OIL-FILLED CONDENSERS—G.E., C.D., ETC.

.05	1000	V	$ .30
.1	2500	V	.95
.1	7500	V	3.25
.12	15000	V	6.95
.25	4000	V	2.75
.25	6000	V	4.00
.5	1000	V	.35
.5	2000	V	.40
1.	500	V	.25
1.	600	V	.30
1.	440	V AC	.30
1.	1000	V	.75
2.	600	V	.35
2.	330	V	.35
2	1000	V	.90
2.	4000	V	4.45
6	2000	V	3.95
8	1000	V	1.75
10	600	V	1.20
3 x .2	4000	V	3.95
3 x 10	90	V AC	.80
4.	600	V	.65
4.	1000	V	1.00
4.	1500	V	1.45

TRANSMITTING MICA CONDENSERS

.00005	1200	V	$ .33
.00005	2500	V	.60
.00005	5000	V	.85
.00007	5000	V	.85
.0001	5000	V	.85
.0001	2500	V	.65
.00025	2500	V	.85
.00025	5000	V	1.10
.0005	2500	V	.65
.00072	5000	V	1.10
.0008	5000	V	1.10
.001	5000	V	1.10
.00125	2000	V	.80
.0015	5000	V	1.10
10 x .25	600	V	.20
.75	2000	V	.55
3 x .22	300	V	.20
.002	2500	V	.39
.005	2500	V	.39
.008	1200	V	.33
KIT OF 12			3.98

$2.00 min. order F.O.B., N. Y. C. Add postage.
50% deposit, balance C. O. D. with all orders.
Manufacturers inquiries invited.

TECHNICAL RADIO PARTS CO.
265 Greenwich St. Dept. C-2 N. Y. 7, N. Y.

YL FREQUENCY

[*from page 48*]

fornia. Her hobbies of stamp collecting, penpaling (she has fifty), and ham radio have combined to give her friends in most every city and village. Hamming, however, has been her favorite hobby since 1938, when she became a licensed ham while still in high school.

Diana's first rig, operated from her home, which was then in Brakpan (Dutch-Afrikaans for Salt Can), was a 6L6 crystal oscillator running 30 watts. Receiver was a National 44, antenna a 67-ft. flat top Windom. All her operating has been on c.w., and for the first year on 40 meters. Later she operated from Johannesburg on 10 and 20 with a halfwave doublet. Choice of bands was largely determined by available equipment. She was never able to work any American hams because her 10 and 20-meter crystals (which she used for c.w. only)put her in the American phone bands.

According to Diana (nicknamed Dee) there are only 10 YLs in all South Africa, so of course she's thrilled at talking with the dozens she has met here. She reports a three-way the other day with Clara, W6TDL, and Maxine, W6UHA.

At home Diana works as a bookkeeper-typist. She lives in an apartment house in the biggest city in South Africa. Even in ZS-land there are antenna-space problems, and Diana's present dream is to establish a beam somewhere on that apartment house roof when she gets back home!

Your YL editor, W2OLB, with this last appearance as column editor, wants to say many thanks for being such good listeners and, for now, so long and 73.

YLs - QRU?

This column will continue each month in *CQ*. If you have any news of your own or other YLs' activities, YLRL doings, etc., you would like reported here, please forward to your new YL editor, Louisa Dresser, W1OOH, *c/o CQ*, 342 Madison Ave., New York 17, N. Y.

V-H-F TRANSMITTER

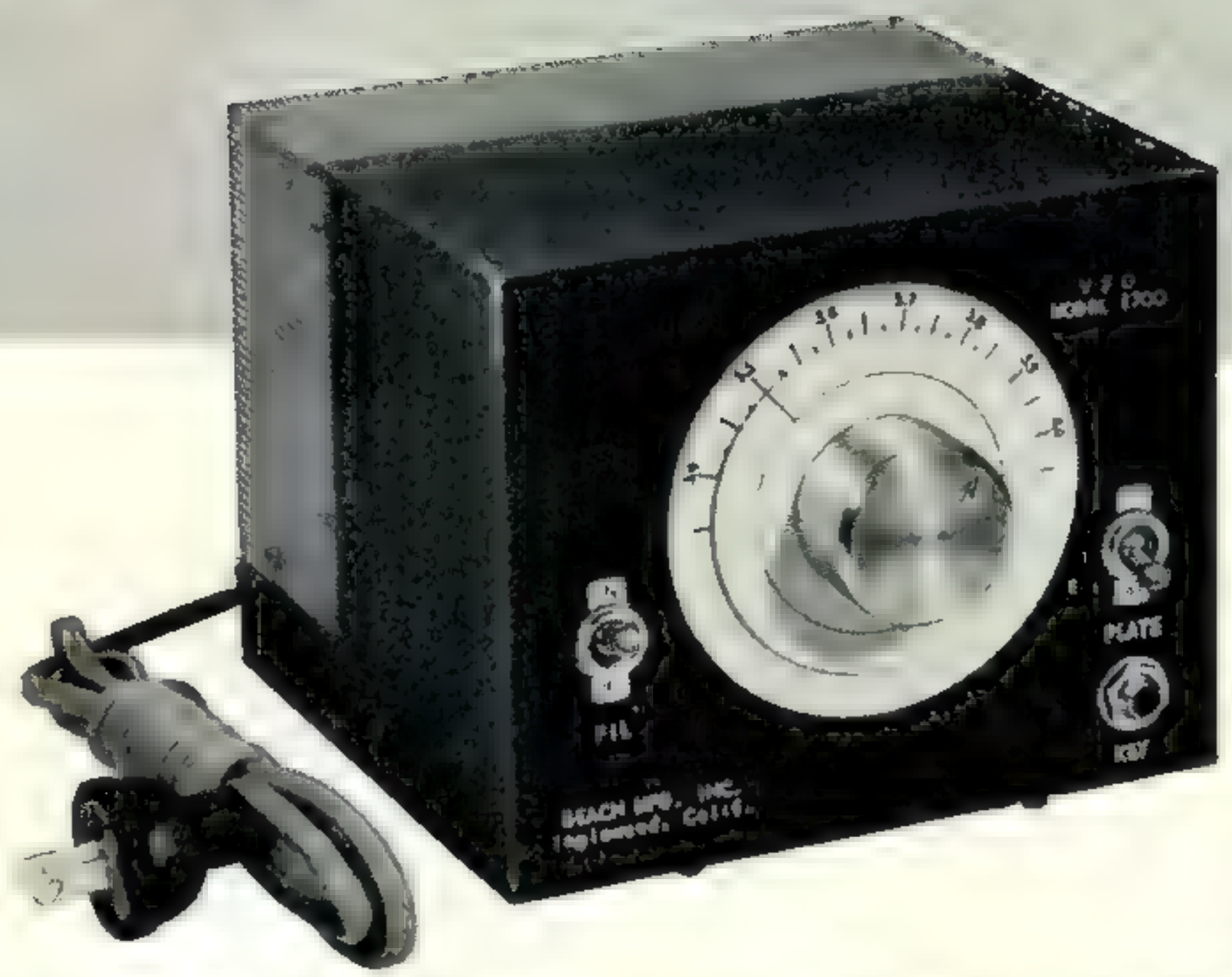
[*from page 18*]

Speak or whistle into the microphone, and the antenna bulb will glow brighter when the modulator is energized. Adjust *R9* until the intensity of the antenna bulb increases only on the *peaks* of speech or with a sharp whistle. The knob on *R9* should be adjusted so it is against its stop when the knob is at about "7 o'clock" and *maximum* rotation at about "5 o'clock." Proper modulation will be obtained at about "1 or 2 o'clock."

Turn *SW1* to its *clockwise* position and rotate *R9* clockwise, to about "4 or 5 o'clock." An audio tone should be heard as the 6J5GT speech amplifier tube and the microphone transformer are now connected as an audio oscillator. Plug a telegraph key into *J2*. By operating the key, modulated-c-w signals may be produced. The antenna lamp will burn brighter when the tone is on.

Some slight variation in the pitch of the tone may be obtained by varying *R9*. However, *R9* must be rotated much *farther* clockwise ("3 to 5 o'clock") for m.c.w. than for voice. If the audio tone is *not* obtained but voice operation is satisfactory reverse the primary (brown and yellow wires) leads on the microphone trans-

NEW... BEACH VARIABLE FREQUENCY OSCILLATOR



Model 1700

STABLE! New type electron coupled oscillator maintains cathode at ground potential. Frequency is independent of voltage variations. Temperature effects are virtually eliminated. Clean, chirpless keying.

ACCURATE! New type vernier dial permits accurate logging of your own spot frequencies. Direct calibrations in frequency on the main dial.

SIMPLE! High voltage heater tubes are used but the power line is isolated from the D.C. circuits. Direct grounding is possible and recommended.

RUGGED! Withstands severe vibration and shock with no change in frequency.

SPECIFICATIONS

FREQUENCY RANGE: 3350 to 4000 kc.

POWER OUTPUT: approx. 1 w. over entire range.

OUTPUT IMPEDANCE: High. May be directly connected to grid circuit of existing crystal oscillator with no matching device needed.

CALIBRATION: Direct on main dial, every 25 kc. of fundamental range. Vernier has 7.5 to 1 tuning ratio.

POWER REQUIREMENTS: 115 v. 50-60 cycles, AC. Isolated power line — no "hot" connections to ground.

THREE TUBES: 12SJ7 oscillator, 50L6GT isolation amplifier, 50Y6GT rectifier.

DIMENSIONS: Only 6 x 5 x 5½" exclusive of dial.

PRICE: $32.50 net to amateurs.

Order your Beach Model 1700 VFO from your radio parts dealer. If he cannot supply you, write direct to:

BEACH MANUFACTURING, INC.

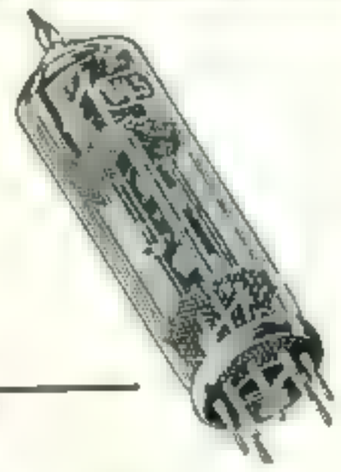
322 EAST BEACH AVENUE INGLEWOOD 2, CALIF.

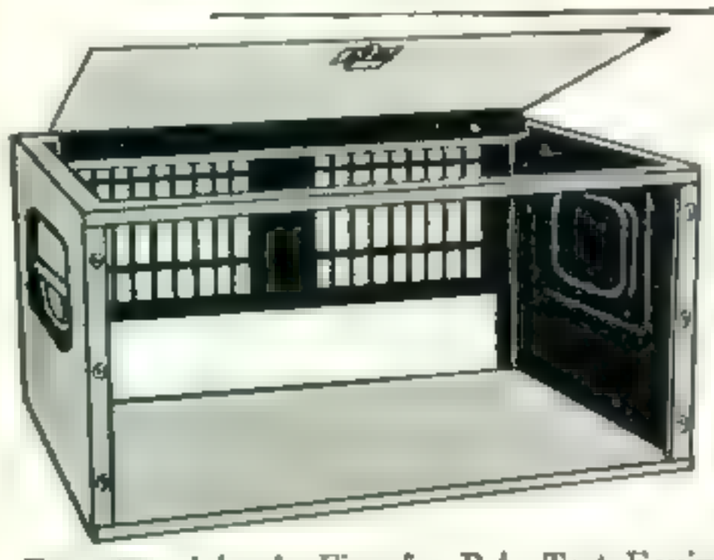
Federated HAM Specials!

MINIATURE TUBES TYPE 6AL5

Here's an outstanding value for you! While present stocks last we're selling these HF Twin Diode type 6AL5 Miniature tubes for only.....

Ten for $3.90





Another Federated Value!

METAL CABINETS

$3.95 each

Exceptional buy! Fine for P.A. Test Equipment, Laboratories, and Transmitters. All metal, black wrinkle finish, 19"x10"x11⅞" deep overall. Takes panel 19x8¾". Recessed handles. Hinged top with snaplock.

Mail Orders: 25% Deposit, Balance C.O.D.

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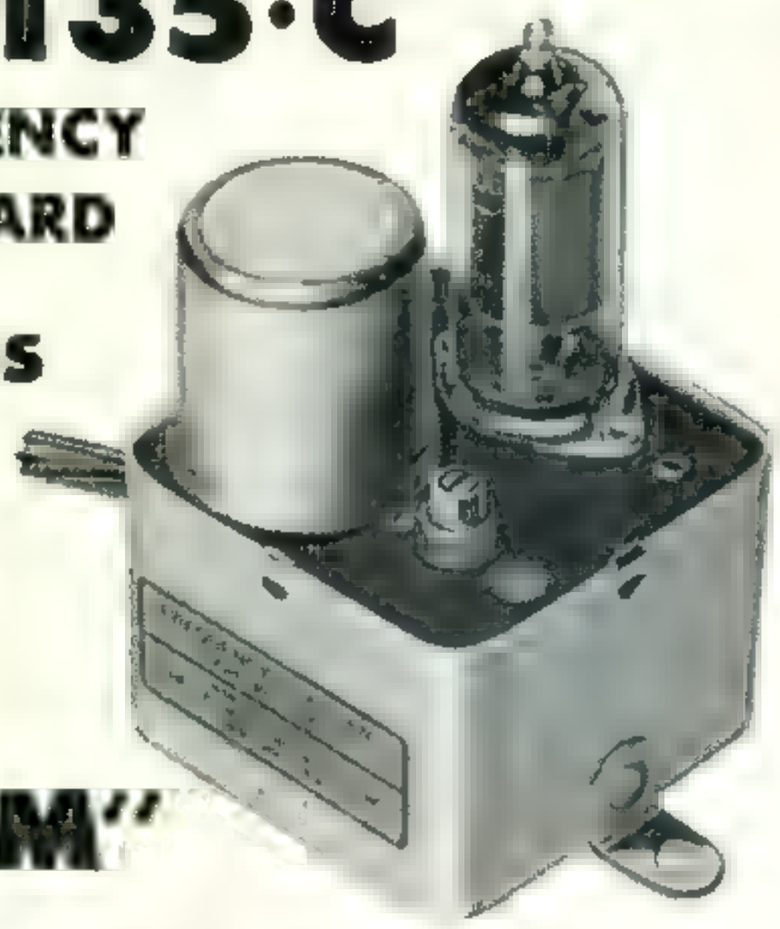
FS-135-C

FREQUENCY STANDARD

Keeps you "ON THE BEAM"



No more "hoping" you're in the band. Mount the FS-135-C Frequency Standard in your receiver, zero beat it with WWV and you'll have a frequency meter that is really accurate.

HAMMARLUND

THE HAMMARLUND MFG. CO., INC., 460 W. 34TH ST., NEW YORK 1, N.Y.
MANUFACTURERS OF PRECISION COMMUNICATIONS EQUIPMENT

former *T1*. Merely reverse the position of these wires on *SW1*. The audio oscillator requires a certain polarity of the wires of the transformer and sometimes the transformers are wound differently, making it necessary to reverse the primary. This will not affect the voice operation in any way.

Connecting The Antenna

After obtaining satisfactory voice and m-c-w performance from the v-h-f transmitter, connect a suitable antenna to the two front panel binding posts. Adjust the coupling loop until the plate current (as measured in *J1*) is 45-50 ma. If a meter is not available, adjust the antenna loop coupling until a decided increase in the glow of the meter-substitute lamp is noted. The antenna loop should *not* be jammed up close to the plate loop. It should *never* be coupled any closer than *one-half inch* from the plate loop.

After coupling an antenna to the transmitter, readjust *C1* to place the oscillator on the desired frequency in the 144-148 mc band.

Operating the Transmitter

Connect a two-wire line between the 2-pin female receptacle (*S5*) on the front apron of the transmitter power supply and the Send-Receive switch on the v-h-f receiver. Then, when the Send-Receive switch on the receiver is operated, the circuit to relay *RY1* will be closed, and if the a-c input to the transmitter is on, the transmitter high voltage will be turned on and off. After connecting the transmitter control to the Send-Receive switch, *SW3* should remain *off* (in down position). However, *SW3* can still be used to turn the transmitter on and off if it is desired to listen to your own signal in the receiver. Feedback (a severe audio howl) will result if the transmitter is voice-operated while the receiver is on and its speaker connected.

• • • — • —

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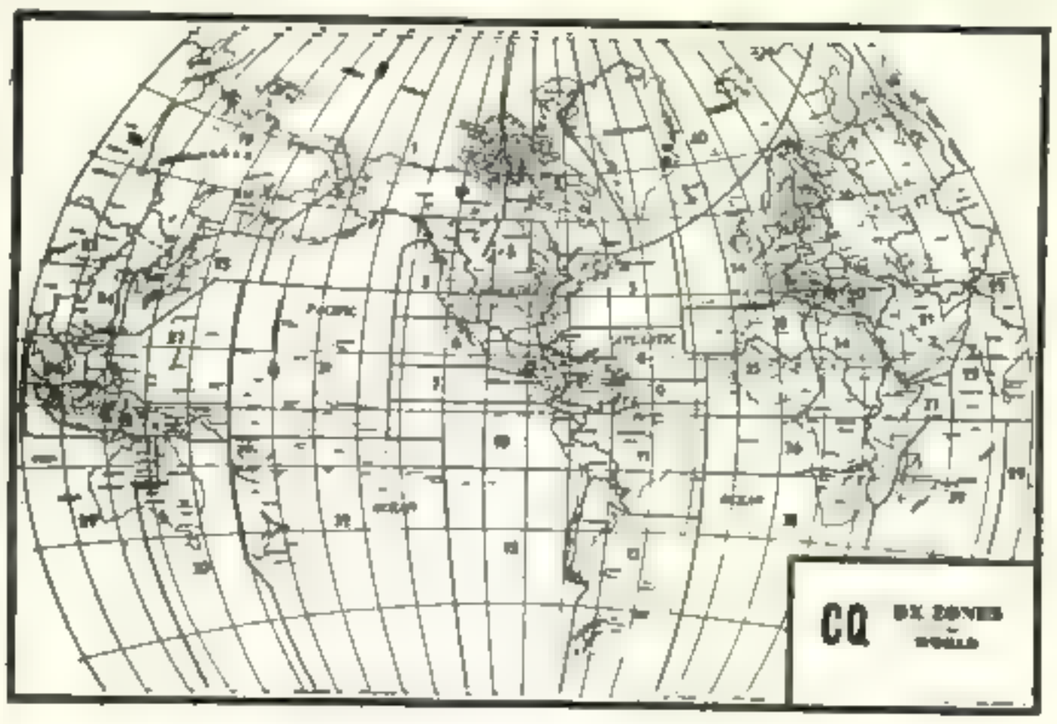

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S-METER OPERATION

[*from page 32*]

series potentiometer (R321) until the meter readings are correct at both of these points. At that time, a signal input of *one volt* is equivalent to a reading of 120 db on the meter. The accuracy is claimed by the Naval Research Laboratory to be within a fraction of a decibel over the entire scale.

A simplified schematic of the a-v-c and the i-f unit appears in *Fig. 3.* The a-v-c system utilizes the right-hand half of the 6H6 detector and a-v-c tube. The plate of the final i-f tube is coupled to the a-v-c diode. A delay voltage (bias) is applied to the cathode of the a-v-c diode to prevent a-v-c action below a predetermined input signal level. This voltage is obtained from the bleeder network R327, R328, R325 and R321. A d-c voltage is set up across the diode load resistors R338 and R355. The full voltage developed is fed through the filter resistor R354, and controls the grid bias of the two r-f amplifiers and the first and second i-f stages The final i-f stage is not controlled by the a-v-c voltage, since proper operation of the a-v-c diode requires the operation of the final i-f amplifier to be at its optimum output capabilities.

An *audio* a-v-c action is obtained by using the voltage drop across R338. This action supplies the grid bias for the first audio tube. The a-v-c time constant is determined largely by capacitor C342-A. The time constant is made as small as possible without introducing serious distortion on low modulation frequencies. The potentiometer R363-A is the audio volume control.

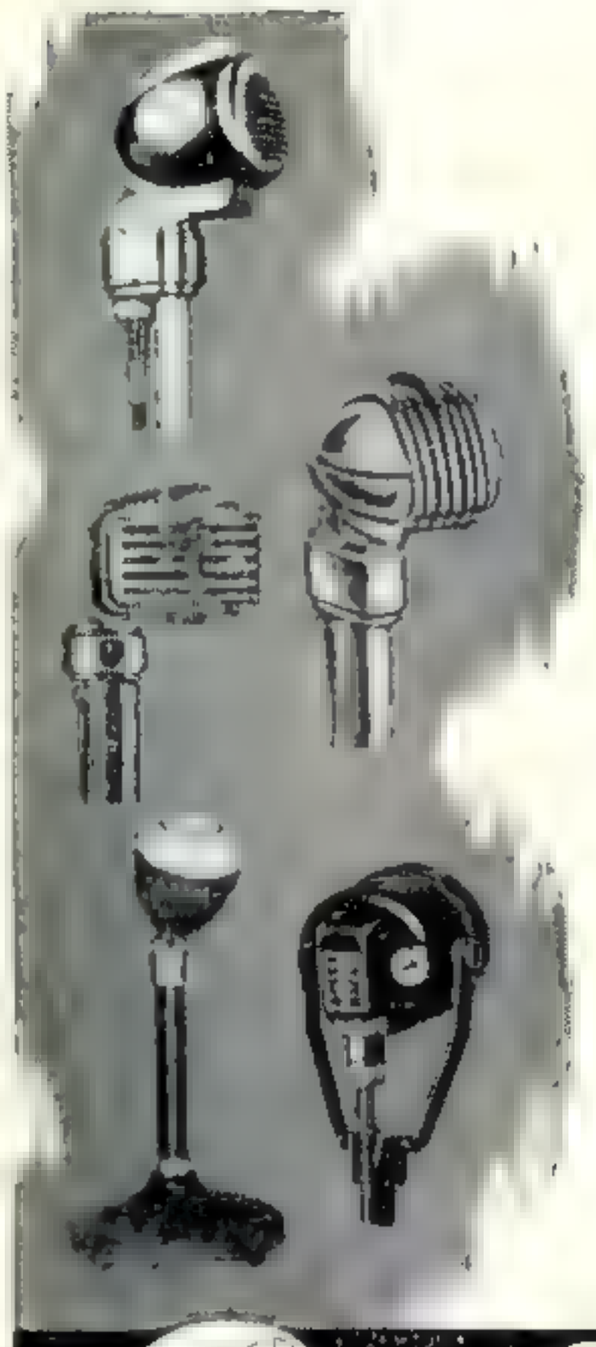
Whatever the means of obtaining a wide and approximately linear input or S-meter for our communication receivers we must immediately strive for a recognized standard of the S-9 level. Possibly the experiments we have performed will start the ball rolling in the right direction. In any case, a uniform system of reporting signal strengths, such as "you have an input of 10,000 microvolts", or "you are 80 db over one microvolt input" are to be preferred to our present day systems.

SCR 522 MODIFICATION

[*from page 29*]

The photo shows, above the receiver, a 7" x 19" panel with a 1-pole 4-position switch, centered and to the left-hand side. This switch controls the channel control motor that selects any one of the four crystal frequency channels of your choice.

Centered on the panel is the meter switch and



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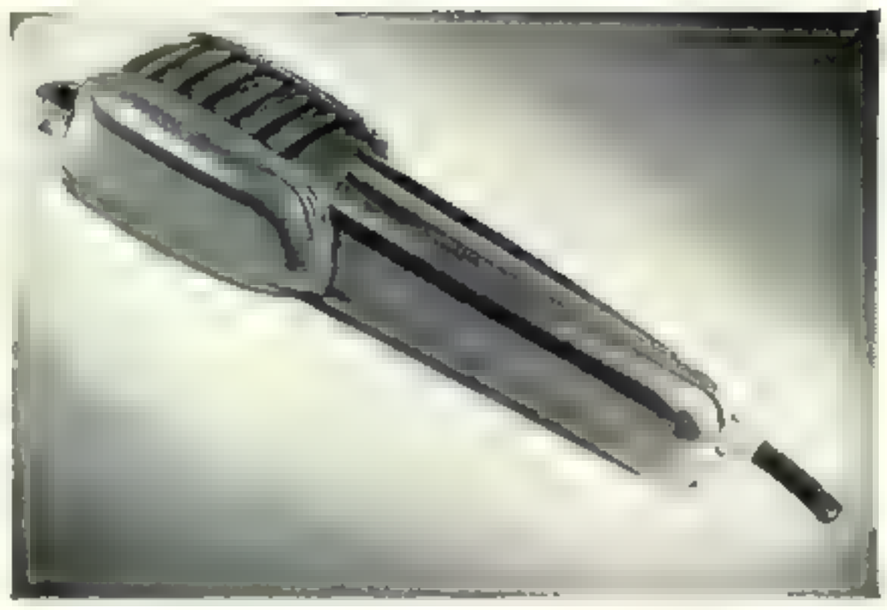

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dial plate that has been removed from its original place in the transmitter. To the right is the 0-1 milliammeter that connects directly to the switch meter terminal. The panel is supported by two home-made "L"-shaped angles which receive their rigid support by being attached to the rack, as described later.

Continuing the detailed description:

a) Arrange the rack so the side that controls the receiver is toward the front. Remove concentric pivot screw in the center of the shifter crossarms. This screw is near the 2-uf condenser, No. 401.

b) Allow the spacers to drop out by lifting the rack tray at an angle.

The crossarms now can be removed by releasing the arm at the shifter first, then moving the crossarm into an angle so that the key-type pivot and the slot of the crossarm that crosses the center of the tray are in a straight line. Move downward and out it comes. This is repeated for the other three crossarms.

c) Remove screws that hold condenser No. 401, relay No. 411-1, and push-button switch No. 426 in their places. Remove the eight screws holding top center cover plate. Place cover aside. The cable attached to the loose components is pressed out of its position so that it is free

d) With a hacksaw begin cutting along the outer edge of the center section on the receiver side. Cut a ½-inch "V" slot between socket No. 417 and relay No. 412. With the sawing finished take a flat file and file down the sharp edges.

e) Remove the two screws that hold the 18-contact center socket in place and lift as high as possible, tilting to the side. The following changes to be made will make this socket of no further use.

f) Connections to control switch. Cut five 8-inch lengths of pushback hook-up wire and solder them to the five switch terminals to be used. Connect and solder the other ends to the leads at socket No. 417. Check the numbers marking each terminal carefully to avoid mistakes. Numbers are according to channel order:

Switch	*Channel*	*Socket No. 417*
Pole	—	No. 1
No. 1	"A"	No. 4
No. 2	"B"	No. 5
No. 3	"C"	No. 8
No. 4	"D"	No. 9

Solder and tape each lead as it is unsoldered from its pin number. According to the type of microphone that is to be used, a 2-foot length of shielded single or double-wire mike cable is soldered to the leads from pin No. 6 and No. 7 of the same socket. Another 2-foot length of pushback wire is connected and soldered to the lead from pin No. 17. The socket can now be reset and the screws replaced.

The "V" slot serves as the outlet for these new cables. Make sure to tape the cable at the point where the cable and "V" slot come in contact to prevent a short at some future date.

g) Remove the two screws holding the 12-contact socket No. 420 in place, lifting high enough and tilting so a lead can be soldered to pin No. 11, an unused terminal. Find terminal No. 8 of No. 418-1 Jones contact plug. Follow other cables to this point and cut, connect and solder. Now at the Jones socket No. 419, unsolder three leads attached to terminal No. 8. Make a continuity test between each lead and terminal No. 2 of Jones socket No. 418-2. The one that shows a complete short is resoldered to No. 8 of No. 419. The other two leads connect to terminal No. 8 of No. 418-1. The addition to the circuit is for the d-c relay voltage.

Socket No. 420 is the SCR-522 voltage terminal. Here is a list of these voltages and pin numbers for reference:

Pin No. 2, 10—High voltage, plus 300 volts d.c.
" " 1—Bias, minus 150 volts d.c.
" " 3—Ground to high voltage, bias and low voltages.
" " 4—12.6 volts a.c. for heaters.
" " 11—13 volts d.c. for relays.

If trouble is encountered in getting a plug for the socket used in this unit, the best bet is to obtain a 6-prong plug (cable type). Connect and solder long cable to it, then connect to leads soldered to the pin numbers according to voltage connections of power supply.

h) The rack tray is now placed over the transmitter, and pressed into position. The red long-shanked screws are replaced and tightened.

i) Next are the unmounted relay, condenser and switch. Remove the switch and condenser by cutting the leads near the soldered terminals. The following color coded wires should be soldered to the relay terminals; brown and brown with red stripe to coil; black to moving contact *arm*, and black with brown stripe to fixed contact.

The relay is mounted beneath the rack tray near its original position. A 6-32 ½-inch screw with washer is passed through the open hole formerly occupied by the red screw. The relay is brought to this screw, and is tightened into position. The other two free wires are cut shorter and taped to the cable.

j) The meter switch pointer is removed; the switch nut is loosened and removed. Remove two screws near the meter plug and press switch assembly downwar ' allowing it to support itself. Remove number plate. Now prepare seven 12-inch lengths of hook-up wire.

Make a circuit drawing of the switch terminal numbers and the color coded wire soldered to them. Double check it. Unsolder all leads attached to the switch. Connect and solder the extension leads to each cable wire. Tape and guide the leads through the open section of the transmitter near tuning controls to the other side.

Now check each lead according to circuit drawing and resolder to the meter switch. Two additional leads are soldered to the terminals on the switch occupied by the meter plug contact pins.

k) The panel "L"-angle supports attached to the bottom of the rack tray are held in place by a screw and nut at the holes formerly used by the receiver long-shanked screws. One of the angles is placed between the relay No. 411-1 and tray. To locate where to drill the angles, place transmutter and rack on top of the receiver frame. The back of the transmitter frame should rest on and line up with the back end of the receiver frame.

The panel is set on top of the receiver panel and kept as straight as possible so that the measurements between the panel and the holes and marking for the angles are accurate.

The short end of the angle is also drilled at this time. The angles are placed into their positions with the short end of the "L" upward. The panel is again correctly placed against the angles, a scriber is used to mark the position of the holes on the panel. A hole according to the size of the flat screw used is drilled at this mark through the panel. It is then countersunk so that the head is at panel level.

l) With the transmitter and receiver as they are, power cable connections for the receiver are to be made. Jones socket plugs to fit the 10-prong type used by the receiver and rack are obtained. Three leads 16 inches long of shielded wire are cut. Each lead is connected and soldered to the same number terminal of the plug and socket. The numbers and their uses are:

No. 3—300 volts B plus; No. 5—300 volts B plus; No. 7—B minus (shields); No. 8—13 volts a.c.

The exposed terminals of the plug and sockets can be covered with tape forming an insulation against possible shorts. Make cable connections between the units.

m) The lead from No. 17 of socket No. 417 is now wired to the DPDT switch.

n) The shielded mike lead is now connected and soldered to its terminal. If a carbon mike is used, the DPDT switch on "transmit" completes the mike circuit to ground.

o) The transmitter panel is now completed by mounting the number plate and channel switch into its position. Follow next with the meter switch and plate. Last, the meter is mounted and connections between the meter switch and meter are completed. The panel is remounted to angles and the unit is ready for a recheck in tuning as described earlier.

p) The channel switching meter always changes the channels according to the A-B-C-D rotation, or substitute 1-2-3-4. Example: Unit is tuned to channel "A" or No. 1. By changing switch to channel "D" or No. 4, the motor will shift through channels "B" and "C" before stopping on Channel "D" (No. 4).

To get best results from the mechanism, do not adjust it unless you have had previous experience with such a unit.

Power Requirements

The SCR-522 unit as a whole requires the following voltages and currents:

310 volts, 230 ma d.c., high voltage.

150 volts, 8 ma d.c., bias voltage.

12.6 volts, 3.5 amp. a.c., heater voltage.

13 volts, 0.5 amp. d.c., relay and motor voltage.

A full-wave selenium or copper-oxide rectifier and a 20-volt a-c source are used to supply the 13 volts d.c. for the relays and ratch motor.

COMMERCIAL APPROACH

[*from page 34*]

zero beating the PTO with any incoming signal, a feature which combined with the accurate tuning dial, allows the unit to be used as a frequency meter. This position may also be used for code practice when listening to the signal in a local receiver. The oscillator is always operating when the operate switch is in the "Calibrate" position. When the transmitter is operating on

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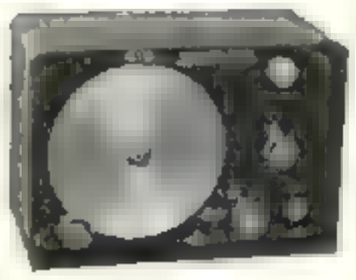

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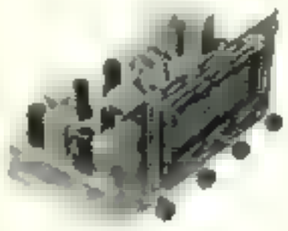

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either phone or c.w., the oscillator is turned off and on with the high voltage switch. When the high voltage is in the "off" position, the oscillator is inoperative. This feature is added for cases where a small amount of feedthru from the PTO might prove objectionable.

The meter switch indicates each function performed. Final plate current should read 200 ma on phone and 220 ma for c.w. Under these conditions the power input is 140 watts on phone and 150 on c.w. The modulator current reads one-half the value shown on the 0-to-500 ma scale, and should read about 200 on peaks of modulation (or 100 ma). An r-f ammeter is used to read the r-f power output.

A switch is provided on the back of the unit to switch from 600-volt operation to 700-volt operation. For the same power input the efficiency of the final amplifier improves with the higher operating voltage. For instance, if the final amplifier is operated at 600 volts and 220 ma, a higher r-f output will result from 700-volt and 188-ma operation.

The microphone has a push-to-talk circuit included in the microphone connector. A microphone cord having two wires inside the shield may be used since the control circuit uses d-c for the relay control. This makes for a very convenient method of operation. If a separate control for the push-to-talk is desired, this may be taken from the back terminal strip.

As is the case with most projects, the work of many people go into the final product. To John Foster, Don Roberts, and Guy Wright should go much credit for working out details of electrical and mechanical problems in this unit.

LEARN THE CODE

[*from page 22*]

mitted that it is discouraging business, but then receiving progress should be just as rapid as with a partner, assuming the same amount of time is expended. Obviously the method requires a receiver, but a receiver is—or should be—standard equipment in even a projected amateur station.

Code records and tape machines can supplement, but not take the place of, other methods of study. They send perfect code at any desired speed, and are very helpful at first, especially if you are studying alone. Their chief disadvantages are their relatively high cost, and the disconcerting rapidity with which tapes and records are memorized; thereby becoming useless as practice material. Therefore a large number are needed to keep you in practice material. Machine sending has the added disadvantage that it doesn't

sound too similar to particular styles developed by individual operators.

In these days of home recorders, it may be possible to obtain the services of a skilled operator long enough to make a code record. It should consist of the alphabet, numerals and the common punctuation marks announced in voice, followed immediately by the code equivalent. The balance of the record may be filled with short words and mixed five-letter groups. Each character should be sent at a speed equivalent to ten wpm, but with spacing between letters and groups sufficient to bring the overall speed down to four or five wpm. This type of sending is actually easier to copy than when the characters are formed very slowly, because it gives you an instant to think after each one. Furthermore as your copying speed increases, it is not necessary to relearn the sounds of the characters constantly.

The use of the recording is obvious. It gives the services of an expert at the start of your new venture without imposing on good nature more than is absolutely necessary.

Sending the Code

Learning to send well is not easy. When working with another, sending practice—and criticism—is automatically obtained. On the other hand if you are studying alone you do not have this advantage. Fortunately the situation is not hopeless. If you hold your sending speed well below your copying speed you can make a fair appraisal of your own sending. Listening on your receiver to commercial, machine transmissions, and comparing them critically with your own is very helpful. Any deviation heard is an error in your sending.

It is often possible to guess what a word will be after hearing a letter or two, and many commercial stations send each word twice. By connecting a split pair of phones (one unit from two sets of head phones on one band) to the receiver and code practice oscillator, you can attempt to send in step with the commercial station. When you are successful, you are sending perfect code.

A code machine may also be used for this type of practice. Copy a section of tape in the usual manner; rewind it, and put it through the machine again, while you attempt to coordinate your own sending of the same material with that of the machine. These methods are particularly recommended for the "lone-wolf" student, but are helpful to anyone trying to acquire a perfect, machine-like style of sending.

No special list of words for practice is included with this article, because none is necessary. Plain English text is best up to a speed of approximately ten wpm, when disconnected words and random groups should be copied occasionally, so that guessing cannot take the place of actually

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Advertising in this section must pertain to amateur radio activities. Rates. 25c per word per insertion for commercial advertisements. 5c per word for non-commercial advertisements by bona fide amateurs. Remittance in full must accompany copy. No agency or term or cash discounts allowed. No display or special typographical ad setups allowed. "CQ" does not guarantee any product or service advertised in the Classified Section. Closing date for ads is the 25th of the 2nd month preceding publication date.

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QSLs. Samples for Stamp. Henry L. Carter, Jr. W2RSW, 747 S. Plymouth, Rochester 8, N. Y.

SELENIUM RECTIFIERS, half wave 5 ampere $4.25, 2¼ A $2.25, 1½ A $1.85. Full wave 1A $2.50. ½ A $1.85. McMurdo Silver amateur and test equipment stocked. Catalog free. Bursma Radio, R5, Grand Rapids 4, Mich.

AMATEUR radio licenses. Complete code and theory preparations for passing amateur radio examinations. Home study courses. American Radio Institute, 101 West 63rd Street, New York City.

QSLs? SWLs? Samples 20c. Bliley Crystals? Sackers, W8DED, Holland, Mich. (VHF-152, RME-45, RME-84).

TRANSMITTER—McElroy all band MT-35 phone & CW, 50 watts, pretuned bandswitching. This rig never used. In original carton. Just right for that low power rig, or as band switching exciter. In cabinet but can be rack mounted Self contained power supplies. First $125 prepaid gets it. Complete with 10 meter coils, crystal and tubes. Beautiful job. W1EJD, 12 May Street, Worcester, Mass.

FOR SALE: Instructograph, Senior, AC Model, Complete with 10 tapes, built-in oscillator and instruction book. $25. Ed. Newman, W2RPZ, 214 Munro Blvd., Valley Stream, New York.

SELL BC-779 Super Pro 2.5-20 Mc, 100-400 Kc. with power supply. OK except needs alignment on 20 m.-$125 FOB. W2KVY, 145 E. 49 St., N.Y.C. (PL 3-9831).

SELL small quantity of new and used parts. Write for list. W2WV, 4 Prospect Place, Morristown, N. J.

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copying what is sent. Regular English words sent backwards serve admirably.

When you can copy for five minutes and, by actual count, find that you have copied a minimum of 375 characters, each numeral and punctuation mark counting as two, you have mastered the code well enough to pass the code examination. After you have passed it, continue your practice until you are actually on the air.

A few weeks of on-the-air contacts will bring your speed up to 18-22 wpm. Then it is well to learn to copy behind; i.e., allow a word or so to pass before writing anything down. The advantages of copying behind lies in the ease of making clean copy even when the sending station makes an error and has to repeat a word, or when bursts of static and interference cause you to miss letters and words. It is quite difficult to do at first, but the skill is acquired readily with practice. Good operators can copy three or four words behind, and the very best can copy coded groups seven or eight groups behind.

To increase your copying speed above 25 wpm will require diligent practice to recognize whole words and phrases like "the", "and", "-ing", etc., instead of individual letters. When you reach this point, you are no longer a beginner; so no more will be said about it.

Copying on the typewriter is, of course, the ideal way. To be really proficient at it you must be able to touch-type at a speed at least 50% greater than the speed of the code being copied. Once the skill is acquired, copying on the typewriter is much easier than by writing or hand printing.

As has been emphasized before, your aim in sending should always be quality before speed. A sustained speed of something over 20 wpm is the limit for most operators using a straight key. With a semi-automatic "bug" key which makes the dits automatically, somewhat higher speeds can be reached with less effort. Therefore it is a temptation to use one. They are fine, but only after you are complete master of the straight key. If you send poorly on a straight key, you will do worse on a bug. When you do get one, practice with an audio oscillator until you are sure you have mastered it—then practice some more—before using it on the air.

You are undoubtedly sick of that word, "practice", but there is nothing to take its place. One last word before proceeding to the description and constructional details of two practice sets. There are a few individuals who, for some reason or other, find learning the code particularly difficult. If you are one, it is unfortunate, but take heart, because you can learn it. Possibly you will never be able to copy 40 wpm, but you will reach 20 wpm if you remember that one word.

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A perfect ECO Exciter for any amateur transmitter. Reactance Modulator for narrow band FM. Output on 80, 40, 20 and 10 meters. Visual indication of frequency deviation. Self contained, regulated power supply. Provision for CW keying.

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FM permitted at present on 10 meters, and above 29 megacycles.

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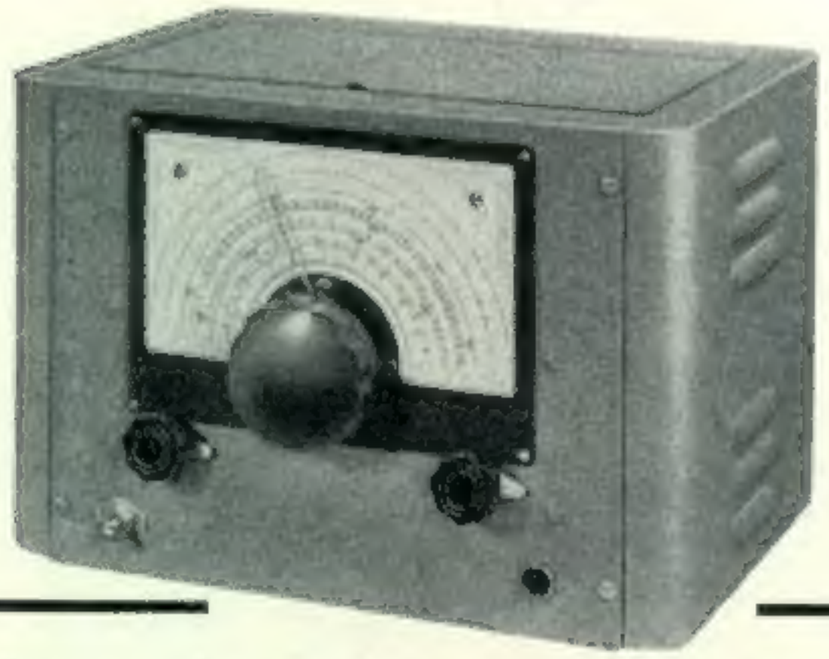

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Designed to operate directly from 105-125 volt 60-cycle A-C source, this converter uses the new selenium rectifier and three new-type miniature tubes. One 6BA6 as tuned R-F stage—one 6BE6 as mixer—one 6C4 as H-F oscillator. Single-dial tuning for controlling H-F oscillator—separate control for R-F stage. This feature eliminates tracking error. Mixer gain may be varied by separate bias control, thus permitting optimum signal-to-noise ratio regardless of receiver used. Stand-by switch controls both converter and receiver. Plug-in coils employed for all bands, one set to cover 50 to 54 mc range and another to cover from 27.180 to 29.7 mc. Output transformer adjustable from 4.7 to 6.5 mc. Kit comes complete with punched chassis, panel and cabinet as well as all parts for one band and complete instructions, less tubes. Gray crinkle cabinet 8" x 12" x 8". Shpg. wt. 15 lbs.

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- **K10456**—Converter completely assembled, wired and tested with coils for 6, 10, 11 meter operation, including all required tubes—Your cost only..... **49.50**

Wired converter sold on 10 day money back guarantee.

Write today for our big, new 144-page catalog—it's chock full of everything you want in radio and electronics. Ask, too, for flyer C-39 with its up-to-the-minute news on ham bargains.

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TEMCO RA
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NEW
Postwar TRANSMITTER

● How many transmitters have you seen or read about in advertisements that have really embodied a new idea . . . a basic departure from conventional design? And have you ever before heard of a transmitter that was purposely engineered to enable you to keep it up-to-date with every new development in communication engineering without having to discard it and buy an entirely new one?

● We at Temco, who have been Radio Amateurs all our lives, have been wrestling with the problem of equipment obsolescence for over 10 years. Our wartime experience assisted us in evaluating the many engineering, operational and production advantages to be gained from the use of small sectionalized units embodying instantaneous plug-in construction. We have applied this tried and proven principle in the design of series RA Communication Equipment.

● We determined to accomplish two important things in departing from conventional practice. First, we wanted to completely eliminate the factor of obsolescence so that in buying a Temco you would always be able to bring your transmitter up-to-date at a minimum cost without having to discard your entire equipment. By means of plug-in chassis unit construction and standard internal cabinet design we have achieved *this aim*. With each new development in radio communication we will produce additional chassis units engineered to enable you to make the necessary additions and substitutions in your TEMCO so that it will be kept up-to-date . . . and that with a minimum investment. Second, we wanted to reduce costs so that more radio amateurs could own a TEMCO TRANSMITTER . . . but this had to be accomplished without lowering the high standards of Temco Craftsmanship which distinguishes Temco Communication Equipment the world over. That meant unusual production economies *Plug-in chassis provided the answer.*

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A. 150 Watt CW
B. 250 Watt CW
C. 150 Watt CW & AM Phone
D. 150 Watt CW & FM Phone
E. 250 Watt CW & AM Phone
F. 250 Watt CW & FM Phone

● Not only will you be able to buy the transmitter tailored to your requirements but your order will be filled *while you wait* at your dealer. As quickly as a cabinet can be removed from its wraps (cabinets are already prewired) and the individual chassis units taken from stock and plugged into the cabinet, that is how quickly your order will be filled. And here is another outstanding advantage in owning a TEMCO RA. Suppose you start off with a 150 or 250 Watt CW Transmitter. Later you want to increase the power or add either NBFM or AM Phone or a VHF Unit. All you have to do is buy the necessary additional chassis units, plug them into position and presto you have your new transmitter. Could anything be simpler . . . more flexible . . . or as versatile?

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TEMCO
RADIO COMMUNICATION EQUIPMENT

TRANSMITTER EQUIPMENT MFG. CO., Inc. 345 HUDSON STREET NEW YORK 14, N. Y.

In tubes for amateur transmitters it's power-gain that counts . . .

. . . and RCA beam tubes have plenty of it

YOUR CHOICE OF RCA BEAM TUBES FOR TRANSMITTER SERVICE					
Type No.	Approx. grid drive (watts)	Max. d-c plate input (watts)	Max. d-c plate volts	Max. freq. at Max. ratings (Mc)	Amateur net price
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828	2.2	270	1500	30	12.50
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NOTE: Class C telegraphy (ICAS) ratings are shown except for 832-A which are CCS.

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RADIO CORPORATION of AMERICA

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